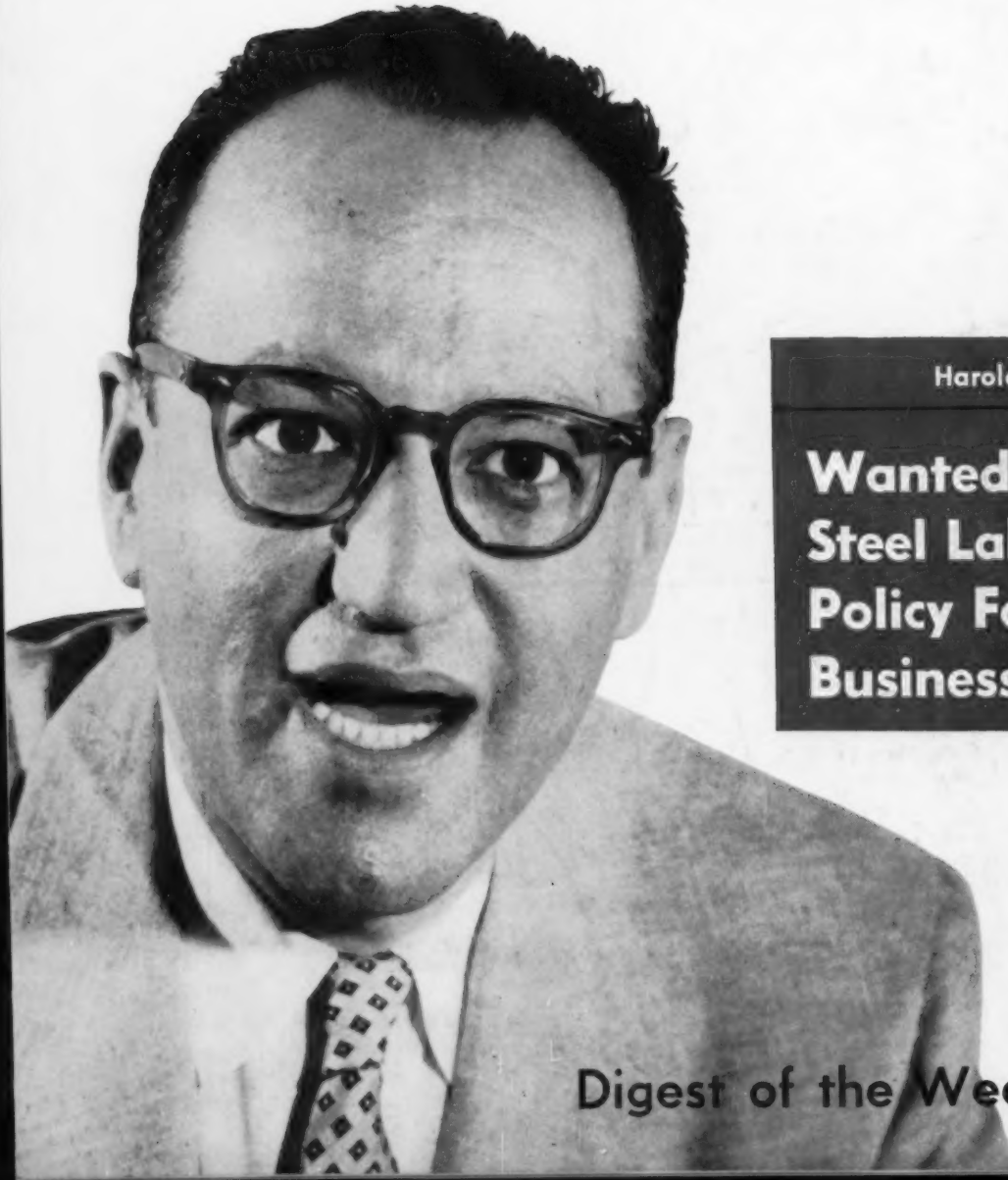
July 5, 1956

The IRON AGE

The National Metalworking Weekly

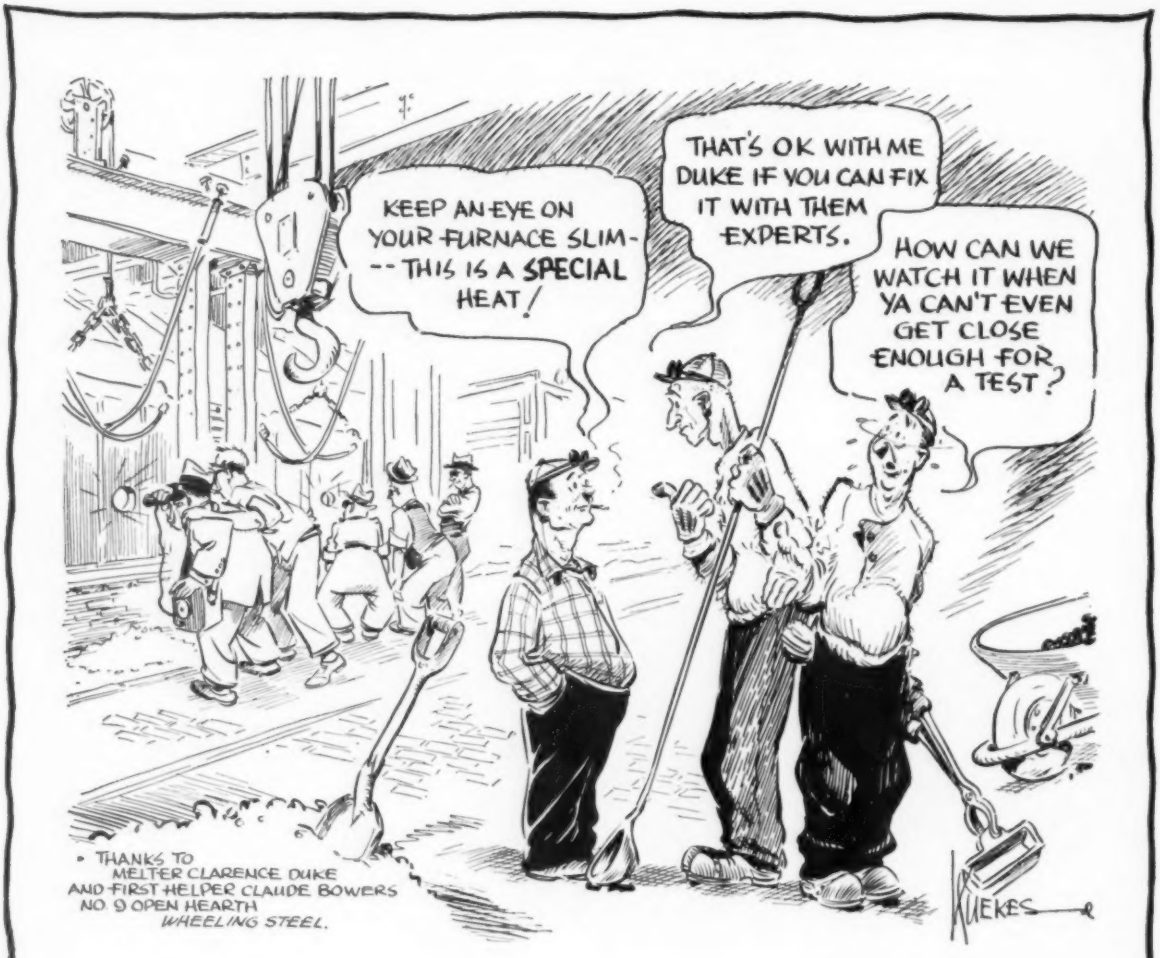


Harold J. Ruttenberg

Wanted: Steel Labor Policy For Small Business P. 27

Digest of the Week P–2

THE OTHER TURN


KEEP AN EYE ON YOUR FURNACE SLIM--THIS IS A SPECIAL HEAT!
THAT'S OK WITH ME DUKE IF YOU CAN FIX IT WITH THEM EXPERTS.
HOW CAN WE WATCH IT WHEN YA CAN'T EVEN GET CLOSE ENOUGH FOR A TEST?
• THANKS TO MELTER CLARENCE DUKE AND FIRST HELPER CLAUDE BOWERS NO. 9 OPEN HEARTH WHEELING STEEL.
KUEKES

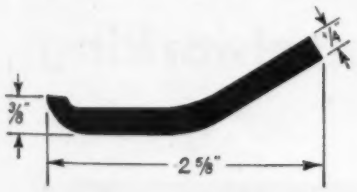
Full house

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

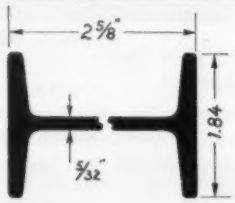
These special bar sections are cutting costs for our customers



Product: **Underknife section for lawn-mower.**

Application: A leading manufacturer of power mowers specifies this special section for his reel-type mowers. After hardening and tempering, the underknife is sharpened and attached to the mower.

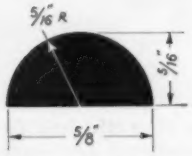
Results:
1. The section is hot-rolled to the precise contours required, making forming operations unnecessary.
2. Rolling the cutting edge eliminates costly grinding.



Product: **Track rail for overhead conveyor**

History: Customer formerly slit and capped a 6-in. I-beam to make this unusually small rail. This required numerous operations and resulted in some scrap loss. He substituted a Bethlehem section hot-rolled to his specifications.

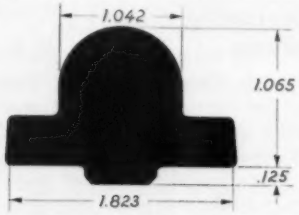
Results:
1. Unnecessary operations and scrap loss eliminated.
2. Customer has a neater, "custom-made" product.
3. Rail is more easily bent into curves.



Product: **Piano string hold-down bar**

History: Only a metal-plated half-round bar is considered attractive enough for this piano part. However, the as-rolled surface condition must be exceptionally fine, and the dimensions must be held with great precision. Bethlehem has supplied this section for well over 20 years.

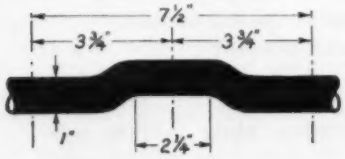
Results:
1. Surface quality so good that a minimum of buffing is required for customer's plating operation.
2. Section has been rolled with extreme accuracy.



Product: **Universal joint trunnion bearing**

History: Formerly individually machined from flat bar stock. Now produced on automatic screw machines using as stock the hot-rolled section shown at left.

Results:
1. Approximately 10 pct saving in steel.
2. Machining costs cut by as much as $.05 per unit.
3. Faster production—one unit every 18 seconds.



Product: **Lading tie anchor for railroad cars**

History: This bar is used to secure bands which prevent shifting of loads in gondola cars. Customer formerly used a large press to offset round bars; he now uses this special section which does not require processing, and is welded directly to the cars.

Results: Bending operation completely eliminated. This resulted in:
a. Reduced production costs.
b. Much faster production.

Could hot-rolled special sections be used to advantage in the products you make? We'd like to discuss the possibilities with you. Just contact the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

July 5, 1956—Vol. 178, No. 1

The IRON AGE

Digest of the Week in Metalworking

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Address mail to The IRON AGE
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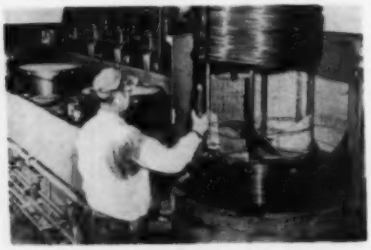
NEWS DEVELOPMENTS

MERCHANT WIRE SALES GETTING HOT P. 32

After a slow start, merchant wire activity is gaining momentum. Large



orders from farm districts, distributors' price hedging are creating a backlog in orders. Last year's figures may be approached.

WORLD'S LARGEST CLOSED DIE FORGING P. 33

Alcoa claims closed die forging it is making for Martin XP6M SeaMaster is world's largest of its kind. Also, reports dies used are largest ever made. Plane completes list of firsts by being world's first multi-jet-engine seaplane.

FOREMEN: THERE'S ROOM FOR IMPROVEMENT P. 34

Some veteran foremen might be skeptical, but a survey recently taken in 35 industrial plants indicates union stewards have more general ability than foremen. Surveyors tell why and give the possible solution.

MAGNETS DUE FOR A CHANGE P. 38

New manganese-bismuth compound developed by Westinghouse scientists is expected to radically change design of permanent magnets. Formability and resistance to demagnetization will appeal to electrical industry.

HAROLD J. RUTTENBERG now operates a metalworking company, but for 10 years was a top USW official. None-the-less, he takes a dim view of the steel wage-price squeeze imposed on his and other small businesses. See story, P. 27.

LATE DEVELOPMENTS IN STEEL LABOR TALKS P. 124

Iron Age reporters have kept close tab on the critical steel labor negotiations from the beginning. This is a down-to-the-wire analysis of the situation from a front-row seat at negotiating sessions.

FEATURE ARTICLES

DOUBLE INSPECTION ASSURES 'SAFE SERVICE' CASTINGS P. 67

Every foundry likes to turn out near-perfect castings. Where the public's safety's concerned, it's an especial must. American Steel Foundries make such castings—all requiring 100 pct inspection. Special equipment handles as many as 1000 castings per day, and up to 40 different patterns in regular production. Now inspection takes an average ½-1½ minutes per casting.

MAKE QUALITY INGOT FROM SUB-GRADE SCRAP P. 70

The brass ingot maker takes various grades of scrap metal, melts and refines them for foundry customers. Problem is deciding which scrap grades are suitable. Profits depend on pricing, peculiarities of maker's practice. This West Coast firm has been profitably using scrap normally considered sub-grade for more than 10 years. Here's what it does with irony brass, a common scrap—and how it does it.

INDUCTION BRAZING: ADVANTAGES JUSTIFY COSTS P. 72

High costs of operating induction joining equipment still exist, but are less important. More fabricators are recognizing advantages of method. In brazing, technique lends itself well to high, low volume production. Workers find it cleaner, less fatiguing.

MACHINE ROUGH, FINISH GRINDS AUTOMATICALLY P. 78

Retooling for brand new products or major changes offers challenging production improvement opportunities. Here's how a new, automatic grinder helps this large firm surface grind, lap pump covers and pump bodies. Machine features a unique parallelogram-type head suspension in addition to automatic transfer, gaging and wheel-dressing

CONSTANT-FORCE SPRINGS HELP DESIGN PROBLEMS P. 80

Here's one for designers, production people—constant force springs. They reputedly work at constant force throughout their full extension, even if a hundred feet long. Work output is almost constant and self-controlling. They can mean more power in less space; possible elimination of costly motors, governors, gear trains.

MARKETS AND PRICES

NEW DEVELOPMENT IN CONTINUOUS CASTING P. 31

Combination of vacuum pouring and horizontal casting open new vistas in continuous casting. Scovill orders production machine for rounds and strip. Slab casting machine in the works. Possibilities for steel.

PROPOSED HOUSTON MILL CREATES FAST-TAX MUDDLE P. 36

Jones & Laughlin Steel Corp.'s proposal to build a million-ton steel plant near Houston puts defense mobilization people on the spot. The question of whether to grant fast-tax concessions is a delicate one.

WHAT PRICE STEEL EXPANSION? P. 41

Steel consumers who feel remiss over price increases may find in the long run they will have benefitted. Mills must pay higher dividends to attract risk capital. Result: expansion, greater production, lower prices.

FORD SCORES IN DEALER BILL FIGHT P. 44

At a Ford Motor Co. meeting, dealers were shown how the O'Mahoney and Monroney bills, if passed by Congress, would have an adverse effect on their profits. Result: Some dealers have started backpedaling.

BDSA TIGHTENS UP RULE ON NICKEL P. 130

Under new ruling from Defense Material System, BDSA, nickel alloys are now under their jurisdiction. Generation of scrap also considered in defense allotments. Alloys affected by new ruling.

NEXT WEEK:

H-IRON: COMPETITION FOR THE BLAST FURNACE

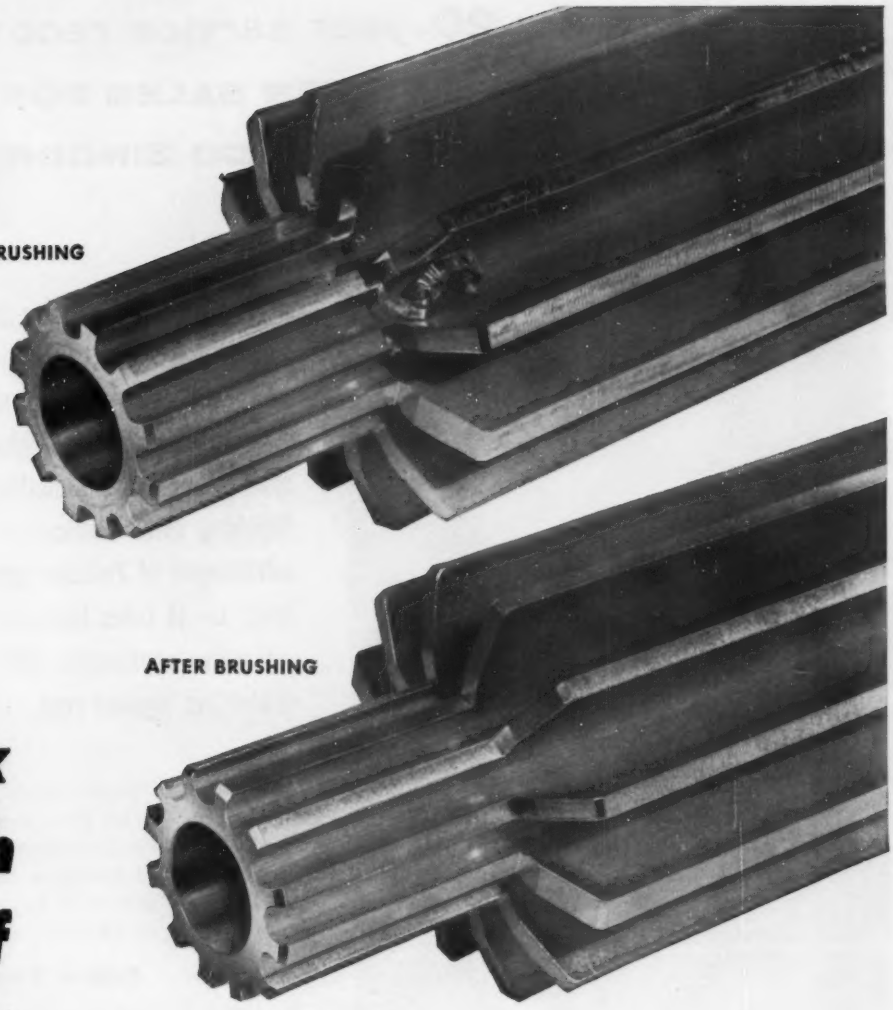
The H-Iron process directly reduces iron ore fines with hydrogen—efficiently and cheaply. Almost every sizeable U. S. steel producer is interested. End product — metallic iron — suits both openhearth, electric furnaces.

If you haven't read this important booklet, your production line may be operating at less than peak efficiency. Your operations may be beating competition with HSS today, but you will likely need carbide tooling to be the leader tomorrow.

Write for your free copy of this important booklet today!

Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.



Quick brush off for burrs

MACHINING this extruded aluminum armature shaft for an aircraft generator turns up heavy burrs. However, Osborn's power brushing method quickly removes burrs and—at the same time—blends all sharp edges.

This is typical of how industry is using Osborn power brushing to improve and speed up thousands of finishing operations.

An **O**sborn **B**rushing **A**nalysis made in your plant will show how *you* can profit from Osborn power brush finishing. Write *The Osborn Manufacturing Company, Dept. F-47, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

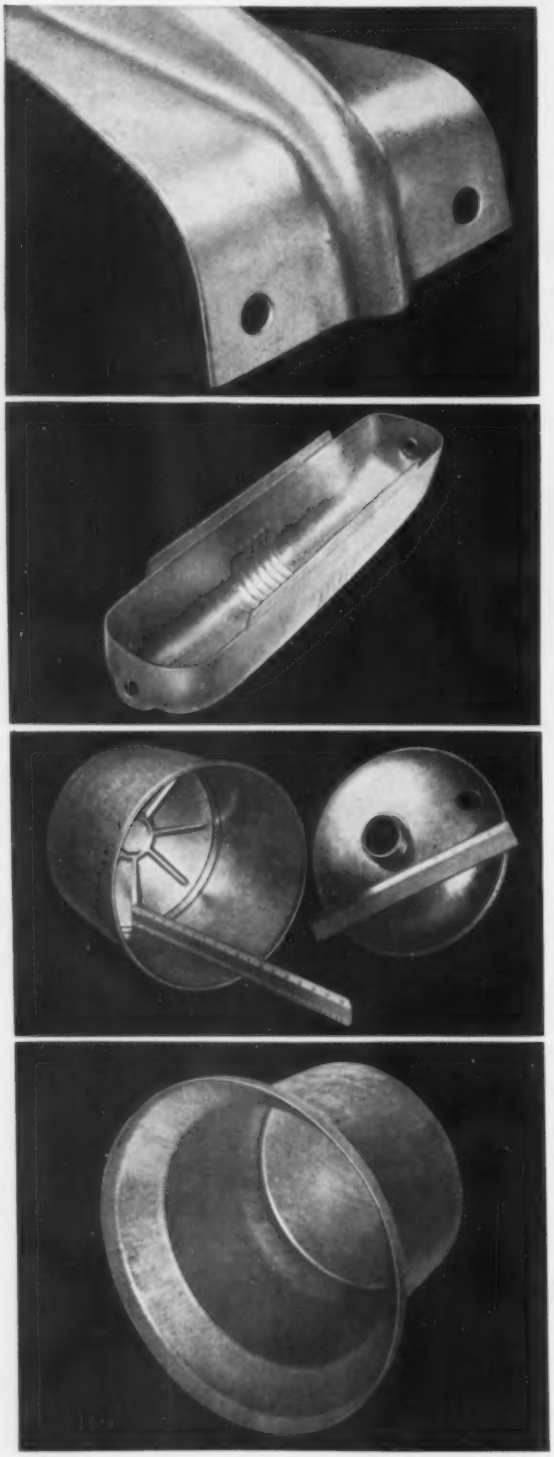
OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Here's a 20-year service record of

LOWER COSTS, EASIER SALES FOR USERS OF DEEP-DRAWING ARMCO ZINCGRIP STEEL

Products such as these have been made of Armco ZINCGRIP Steel since 1936.



For more than 20 years drawn and severely formed parts like these have been made of Armco ZINCGRIP Steel at less cost in the shop. The reasons are: no flaking or peeling of the special hot-dip zinc coating, elimination of finishing after fabrication, and the production advantages of ZINCGRIP coils. ZINCGRIP also helps boost sales because of its attractive appearance and unbroken protection against rust.

In 1936, when Armco introduced ZINCGRIP, the *first* continuously zinc-coated sheet steel, designers and production men found it difficult to believe that a zinc-coated sheet could be drawn without damage to the coating. But a few trials—reverse draws, lock seams and roll forms—proved that the special coating on ZINCGRIP didn't flake or peel.

Proved in 20 Years' Service

More than 20 years' experience in hundreds of manufacturing plants has established this fact: *Anything that can be done with sheet steel can be done with Armco* ZINCGRIP. You don't have to baby it in the shop, and its formability gives you much greater freedom in design.

Twenty years have also proved that ZINCGRIP resists yellow rusting longer than ordinary galvanized. This, plus the smooth, attractive surface of ZINCGRIP, makes products easier to sell and keeps your customers satisfied.

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FOUNDED 1855

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

EDITORIAL

Is Freedom Worth Much To Us?

◆ JUST 180 YEARS AGO this week, we as a nation declared our independence. Our ancestors paid dearly in life, limb and property for what we have today.

We have been involved in many battles since 1776. Some devastated parts of our country. All took their toll of lives and bright futures.

The last three wars cost us heavily in lives, material, money and natural resources. Yet in those wars our country was not torn from one end to the other. Our homes were safe and our lands undisturbed. The next time it will be different.

Due to our machinery we are able to have guns and butter at the same time—or so it seems. Maybe some day it will turn out to have been too much butter; too few guns.

In the midst of the most awful and significant cold war the world has ever seen, we are reaching new heights in civilian comfort. Our schools have filled parking lots that would have staggered the imagination 20 years ago.

We have an economic growth that seems miraculous. Our industrial frontiers are limitless. Our unemployment is down to the point where most who can and would work have a job. Our wages and fringe benefits are the talk of the world.

Along with this cold war and a record $400 billion Gross National Product there are many paradoxes. Almost as many savings bonds are being turned in as are being bought, yet they pay 3 pct interest.

Men leave the armed services after astronomical sums are spent on their training. Strikes are frequently called on national defense work.

Our atomic defenses at home are pitiful; there is little or no civilian support. The Reds clobber us with sickening sweet talk and we fall for it. Our Congress degrades businessmen who would work in Washington for their country.

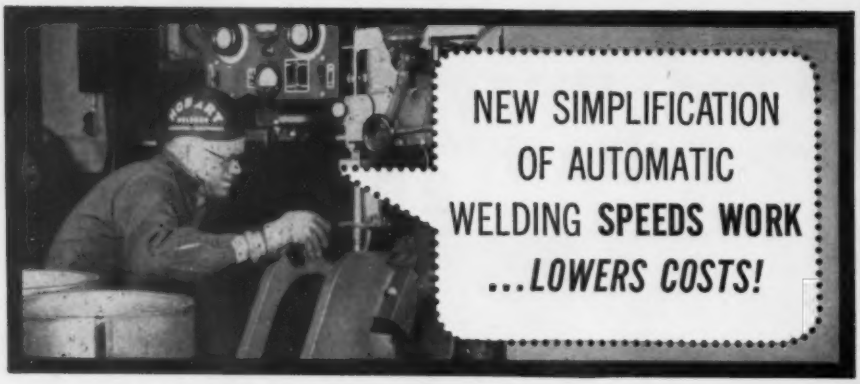
We say "Never mind, we'll win when the chips are down." That could be our last will and testament.

Just how much is freedom worth to us?

Tom Campbell

EDITOR-IN-CHIEF

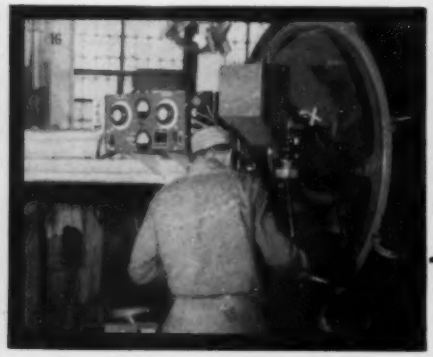
HOBART arc welders



NEW SIMPLIFICATION OF AUTOMATIC WELDING SPEEDS WORK ...LOWERS COSTS!

Don't overlook the big factor of speeding your welding operations. You'll be amazed at the savings made possible by fully automatic welding, using your own men to successfully do higher quality welding. No special experience necessary.

No complicated setups. No troublesome electronic or delicate electrical controls. The new Hobart "Simplified" automatic welder is definitely a valuable cost cutting tool in small shops as well as the larger plants in offsetting rising costs.



It's vitally important today to investigate new and better ways of speeding production. The advantages to be gained with automatic welding can be measured to show how Hobart's new, faster method of fabrication can lower your costs.

Why not check the coupon now, and get complete information on the new automatic welder to see how profitably it can work for you—no obligation. HOBART BROTHERS CO., BOX IA-76, TROY, OHIO, *phone 21223, one of the world's largest builders of arc welding equipment.*

CARBONAIR CUTTING and GOUGING

Makes quick work of cutting and gouging of all metals using carbon arc and compressed air

Hobart's Carbonair has been specially designed with plenty of power for fast cutting and gouging. Eliminates necessity for oxygen and acetylene tanks. Removes defects in castings, cuts gates and risers—cuts ferrous and non-ferrous metals the easy way in preparation for weldments. Write for bulletin A-365-E.

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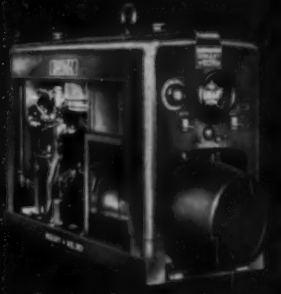
HOBART'S New...faster WELDING ELECTRODES

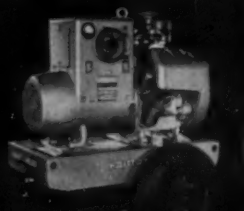
You'll like these new, faster electrodes. All Hobart electrodes are precision made, rigidly inspected and tested to assure uniform high quality. You'll never know the real difference in electrodes until you've tried Hobart. Write for complete catalog.

HOBART welding electrodes

Standard Electric Motor Drive



Standard Gas Engine Drive



Air cooled Gas Engine Drive

DC Rectifiers 300 & 400 Amp.

AC Transformers 180 to 500 Amp.

HOBART BROTHERS COMPANY, BOX IA-76, TROY, OHIO, U.S.A.

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☐ Carbonair cutting and gouging.
Also send information on your standard welders.
☐ Elec. Motor Dr. ☐ DC Rectifier ☐ AC transformer ☐ Gas Eng. Dr. (air cooled) ☐ Gas Eng. Dr. (water cooled) ☐ Information on the new welding electrodes.

Name_____ Position_____

Firm_____

Address_____

dear editor:

letters from readers

Bunk About Reds

Sir:

I liked your editorial "The People Should be Told."

Maybe you can tell me how, in spite of the Iron Curtain, we know how many planes, submarines, cruisers, atomic weapons and the like, Russia has at this time and how many they are building.

I am not willing to take the word of liars, murderers, thieves and the like as being truthful. I am also convinced that it would take hundreds of men, hundreds of days to wander through Russia and really get some information which might be of value. I doubt whether any commission, any small group of experts, can visit Russia and in a couple of weeks' time come up with an answer.

I think it goes without saying that you must now believe that in my estimation, most of the propaganda handed out to us about Russia's strength is just plain unadulterated bunk. *R. L. Giebel, New York, N. Y.*

Don't Give Up The Ship

Sir:

We feel your June 7 article "Economy: Don't Give Up The Ship" is an excellent and factual report of conditions as they exist today. We heartily agree with your comments and wish to compliment you on its timeliness.

We would appreciate very much if you would send us quite a number of copies, since we feel their distribution will tend to create an air of confidence which is all we need at this particular time. *L. Sitkin, Sitkin's Junk Co., Inc., Lewistown, Pa.*

Complete Job

Sir:

Please send us three or four copies of the "Rod & Electrode Comparison Charts" with the article "How To Get More For Your Welding Dollar" which appeared in your April 26 issue. We think this is a wonderful article and would

TIG Welding With CO_2

like to show it to our customers.

As for the comparison charts, we would like as many as you can spare. We would like to pass these on to our salesmen since it is the most complete comparison chart we have ever seen. *S. Segal, General Welding Equipment Co., St. Louis, Mo.*

Prejudiced View

Sir:

In the March 29 issue of THE IRON AGE, you published an article entitled "How Warehouse Buying Pays." Congratulations, even though prejudiced, we think this to be an excellent article!

In this article you mentioned a "Mark Purchasing Lot Size Calculator." May I ask where we might secure such a calculator? *L. A. Douglass, Mgr. Advertising-Market Development, United States Steel Supply Co., Chicago, Ill.*

Write to Mr. Van D. Mark, P.O. Box 67, Mt. Clemens, Mich.—Ed.

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THIN STRIP

for exacting standards only

Not one strip rolling requirement in ten need be carefully "miked" to assure close width tolerance.

But that exceptional job is routine with Somers THIN STRIP. Monel, pure Nickel and Nickel alloys are rolled to within ±5% from .010" to .00075", with the same degree of accuracy in widths, and with the exact properties required by your product.

Modern rolling, annealing and precision control equipment assure uniform high quality under the most rigid specifications.

And Somers 40 years experience in a wide range of applications is available to help solve your strip problem without obligation.

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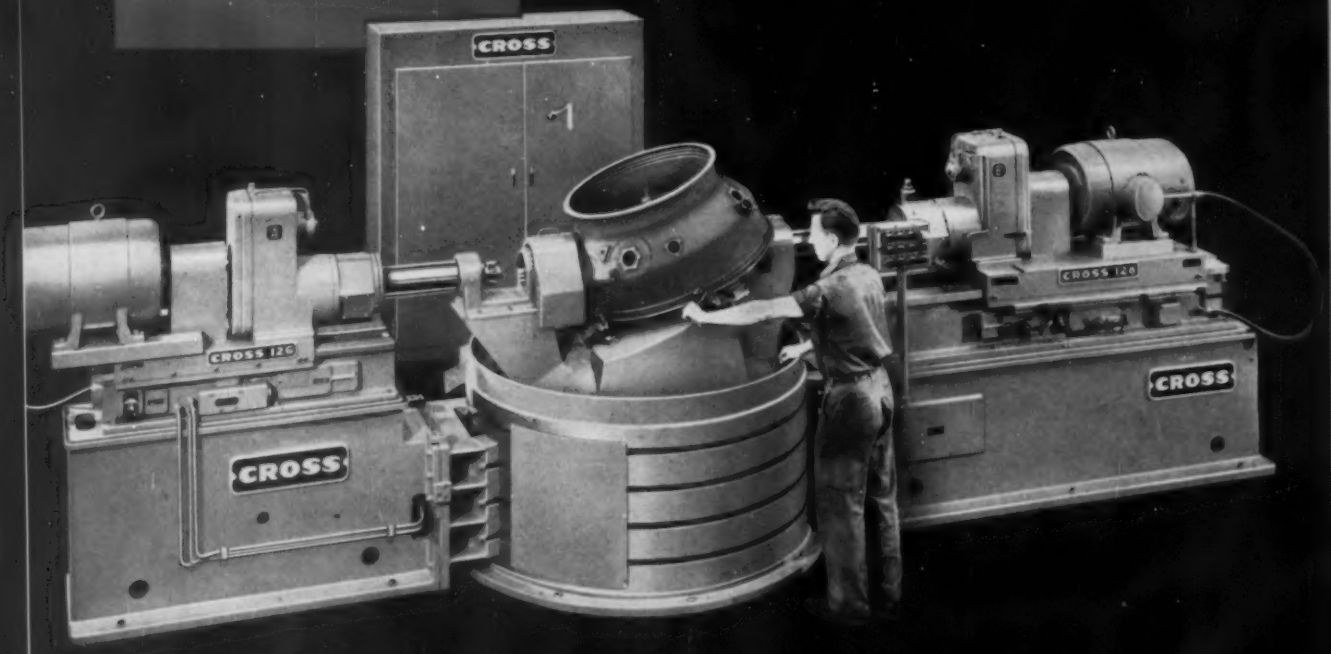
WATERBURY, CONN.

Precision Bores and Faces Diffuser Cases

Another Special by Cross



This Two-Way Boring Machine roughs, semi-finishes and finishes the accessory drive shaft hole of Jet Engine Diffuser Cases at the rate of 2½ pieces per hour. The operator places the part in the work holding fixture and the rough boring cutters in the boring spindles, after which the rough boring is performed automatically. Next, the operator replaces the rough boring cutters with semi-finish boring cutters and the cycle is repeated for the semi-finish boring operation. Then, the finish boring operation is performed in a similar manner and the part is removed.

The cutters are supported in live precision bearing spindles, which are in turn supported by hardened and ground steel bushings adjacent to the work.

All cutters are pre-set for size and are quickly and easily changed for the different operations.

To provide maximum flexibility for future part design changes, the machine is built with Cross Modular "Building Block" Units.

Established 1898

THE CROSS CO.

First in Automation

DETROIT 7, MICHIGAN

fatigue cracks

by William M. Coffey

Why Washington Grows In Importance

Did you know that the national government, under both the Truman and Eisenhower Administrations, spends nearly $100,000,000 a day just for national defense? This adds up to about $36.5 billion a year, of which about one-third is directly related to the purchase of metals or metal products.

Of the total spending of $36.5 billion for military programs, about $11 billion goes for direct purchase of military supplies made of metals—missiles, planes, tanks, trucks, and the like. Another $1.5 billion goes for military research, including the development of new weapons and new destructive techniques. The General Services Administration spends close to $1 billion for unrefined metals and ores for the government stockpiles, and for commercial metal products.

Keeping Posted

To keep you posted on new government policies that affect your business, THE IRON AGE draws upon the up-to-the-minute knowledge of a three-man Washington staff of editors. Among them, these three top-notch correspondents—Bureau Chief G. H. Baker, N. R. Regeimbal and R. M. Stroupe—cover daily every government department and agency that figures in the government's metalworking decisions.

Our Washington staff of editors not only covers the surface sources of news—press conferences, briefings—but also gets in a number of "back doors" at the Capitol and in the departments that produce "meaty" news material not available to ordinary daily newspapers.

To get the news to our head office in Philadelphia accurately and quickly, our Washington office makes use of Bell System teletype (TWX) connections, special delivery mail, and long-distance telephone. Because metalworking's share in national defense is increasing, not lessening, we figure it's worth it. Certainly, in the months immediately ahead, it is clear that you must key a number of your executive decisions to the tune the government is playing.

Puzzlers

Mr. C. W. McKinley says the height of the room is 21.0376 ft and the radius is 7.0745 and so does Arlan Walker, Iowa Ordnance Plant and so do we. (May 31 puzzler.)

Sarie (and a hearty welcome back) and the General Steel Castings Club says Grandpa lived for 84 years and so does F. W. Orttung of the Bakelite Co., and so does John Homer, Norman Chase, James Young and Henry Buresh, Collins Radio Co., and so do we. (June 7 puzzler.) G. M. Hebron, Hubbard Tool & Gage Co., says Grandpa saw only 68.25 years.

Washington Bureau Staff

G. H. Baker

N. R. Regeimbal

R. M. Stroupe

AIRCO

WELDING and BRAZING Hints

PROBLEM:

Brazing and Braze Welding Rod Selection

SOLUTION:

Airco #22 Manganese Bronze Rod. A general purpose rod that should be in every welding shop where high strength brazed joints are required. Flows smoothly and produces sound joints on maintenance work when used with either Airco Marvel Flux or Airco High Test Liquid Flux. Airco #22 is also available with flux already coated on the rod to insure positive base metal protection.

Airco #20 Bronze Rod. Ideal for braze welding of steel, cast iron, malleable iron, copper, and dissimilar combinations of these metals. Airco #20 is available as a pre-coated rod using Hi-Test Flux. When this rod is purchased bare, either Hi-Test or Marvel Flux can be used for high strength welded joints.

Airco #27 Low Fuming Bronze Rod. For the brazing or braze welding of steel, cast iron, or bronze. Low fuming characteristics of this rod increase its applications in restricted areas. Recommended fluxes for use with Airco #27 are Airco Hi-Test or Marvel Flux. Flux coated rods also available.

Brazing and Braze Welding Flux. A good brazing flux cleans the joint, removes oxides created by heating, and picks up impurities in filler metal. Airco Hi-Test Flux, when properly applied, will accomplish these jobs.

Send for this free catalog!
You'll find here the finest rods and fluxes for joining both ferrous and non-ferrous metals. Write Airco at address below.

Request Catalog 9-131A

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1.

The Prescheduling Chart plans the sequence of operations . . . charts the proper speeds and feeds . . . is a permanent record of each tool diameter, speed and feed.

2.

Speed Dial — Preselects any one of 36 speeds while machine is in operation—shift is automatic at end of each operation.

The HEAD that's way ahead

. . . brings you 3 outstanding performance features!

3.

Feed Dial—Preselects any one of 18 feeds for next tool while machine is in operation — shifting is quiet and direct.

The concentration of complete control of all speeds and feeds by two easily read dials on the head is an outstanding advance in design.

Saves time — insures controlled correct operation — and is easy for the operator.

Hydraulic shift for speeds and feeds is quiet and positive. All mechanism for preselection is contained in the head. These ultra modern Super Service Radials have many other advanced features — for easy handling and high productivity.

Write for Bulletin R-33. You will be interested in the many new features.

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CINCINNATI BICKFORD DIVISION

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

dates to remember

JULY

TRUCK - TRAILER MANUFACTURERS ASSN., INC.—Summer meeting, July 19-20, Edgewater Beach Hotel, Chicago. Society headquarters, 710 Albee Bldg., Washington, D. C.

NATIONAL TOOL & DIE MANUFACTURERS ASSN. — Summer meeting, July 25-28, Estes Park, Colo. Society headquarters, 907 Public Square Bldg., Cleveland.

CUTTING TOOL MANUFACTURERS ASSN.—Quarterly meeting, July 25, Lochmoor Country Club, Detroit. Society headquarters, 416 Penobscot Bldg., Detroit.

EXPOSITIONS

WESTERN PACKAGING AND MATERIALS HANDLING EXPOSITION, July 10-12, Los Angeles.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

AUGUST

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. — National west coast meeting, Aug. 6-8, Mark Hopkins Hotel, San Francisco. Society headquarters, 29 W. 39th St., N. Y.

NATIONAL SCREW MACHINE PRODUCTS ASSN. — Annual national sales conference, Aug. 7-8, Wade Park Manor Hotel, Cleveland. Society headquarters, NSMPA Bldg., Cleveland.

WESTERN ELECTRONIC SHOW AND CONVENTION—Aug. 21-24, Pan Pacific Auditorium and Ambassador Hotel. Information, WESCON, 344 N. LaBrea Ave., Los Angeles.

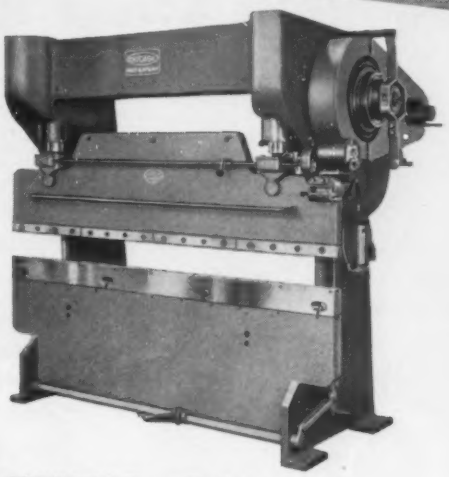
SEPTEMBER

METAL POWDER ASSN.—Fall meeting, Sept. 7-9, Homestead, Hot Springs, Va. Society headquarters, 420 Lexington Ave., N. Y.

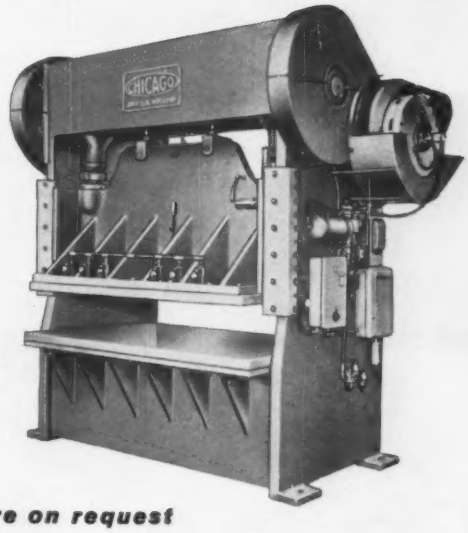
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS—Fall meeting, Sept. 9-12, William Penn Hotel, Pittsburgh. Society headquarters, 120 E. 41st, N. Y.

FASTER
Sheet Metal Operations

Beading
Bending
Blanking
Corrugating
Curling
Drawing
Forming
Joggling
Multiple Punching
Trimming



CHICAGO Press Brakes
Five Models for Sheet Metal Work
11, 30, 36, 50, and 60
Ton Capacities



CHICAGO Straight-Side and Gap Presses with Large Die Area for blanking, punching, trimming, and shallow drawing. Custom built to individual requirements in stroke, die space, and bed area.

Descriptive Literature on request

6181

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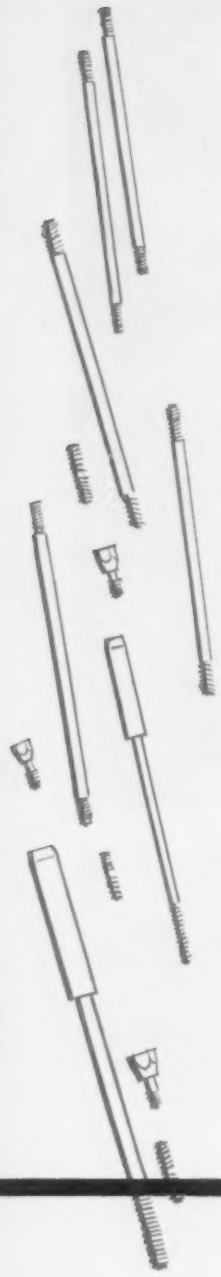
Hand and Power Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.
South Loomis Boulevard, Chicago 36, Illinois



STANOIL *Industrial Oil delivers on tough assignment at Indianapolis Screw Products Corp.*

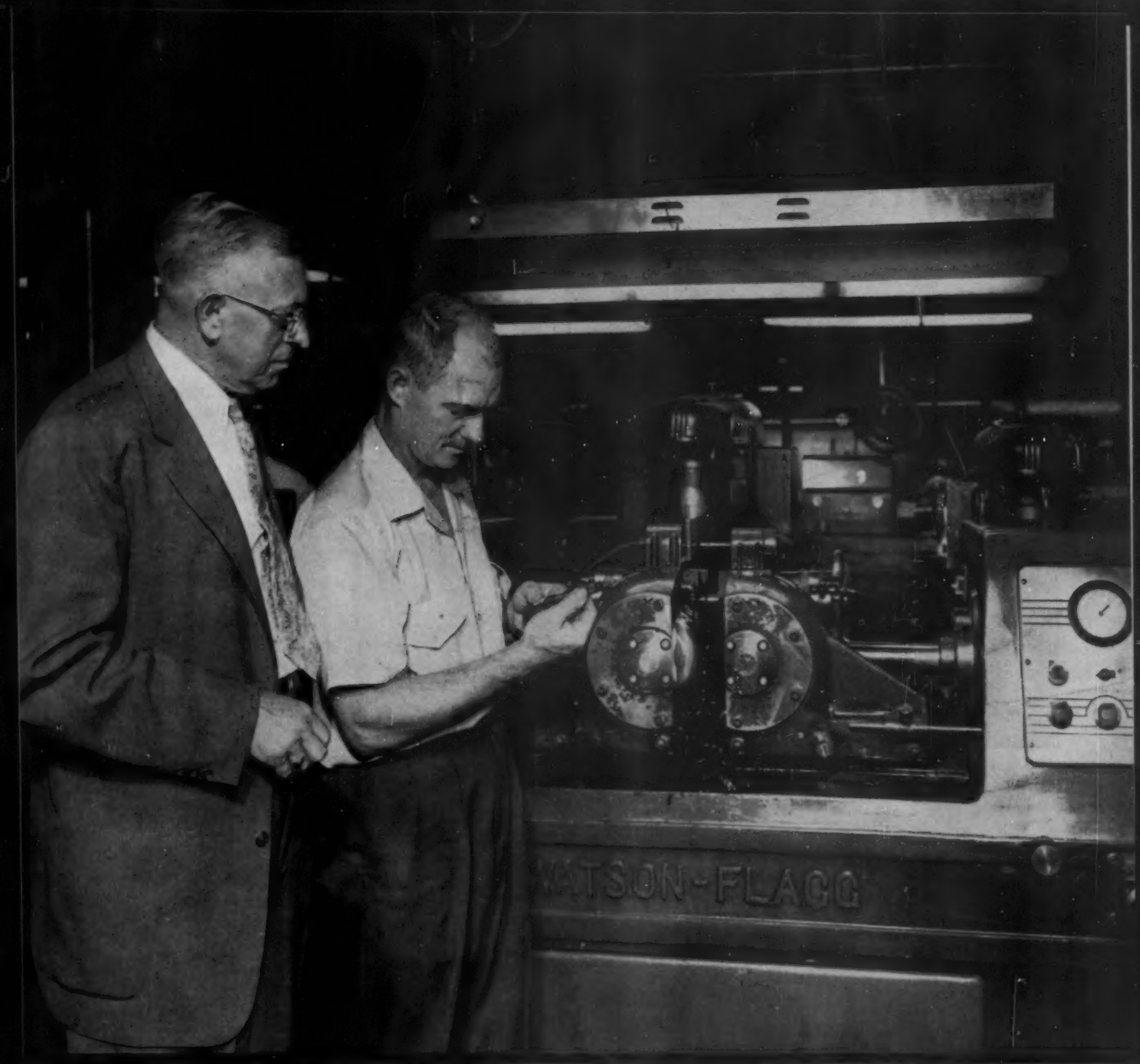
Rolling threads on aluminum bronze with pitch diameter tolerances as close as .0014″ is a tough job but Indianapolis Screw Products Corporation is used to taking on such jobs and delivering. They give tough jobs to the hydraulic oil they use, too, and they expect it to deliver. They've given such a job to STANOIL and they're getting the results they expect—and more.

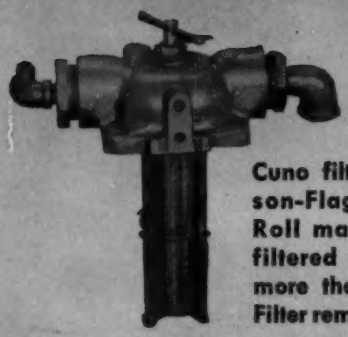
STANOIL Industrial Oil is used in the hydraulic system of a Watson-Flagg precision thread roller in the Indianapolis Screw Products Corporation plant. The system uses a Vickers pump and Cuno filter. The filter has not been cleaned in over a year *because it hasn't needed cleaning.* Here, as in other applications, STANOIL delivers top performance with minimum maintenance and maximum system cleanliness.

STANOIL likes tough assignments like this one; likes them because it can deliver with plenty to spare.

Perhaps you would like to know about the use of STANOIL in a hydraulic application in your plant. In the Midwest and Rocky Mountain states, a lubrication specialist at your nearby Standard Oil office will be happy to discuss it with you. Call him. Or, if you would like, contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Tight gaskets, good maintenance, and STANOIL add up to first rate performance at Indianapolis Screw Products Corporation. This shot of Vickers pump shows how good housekeeping and STANOIL team for top operation on tough assignment.





Cuno filter in Watson-Flagg Thread Roll machine has filtered STANOIL more than a year. Filter remains clean.

Mr. R. W. Williams, Plant Superintendent, checks pitch diameter of thread with Glenn Riggs, Standard lubrication specialist. Glenn Riggs is an old hand at helping industrial firms work out lubrication problems. Glenn has been doing this sort of thing for 28 of the 30 years he's been with Standard. This background and experience, customers have found, pay off *for them.*

STANDARD OIL COMPANY
(Indiana)

STANDARD

RELIANCE DRIVES NEW MILLING MACHINE

This unique milling machine designed for milling big aircraft parts operates exactly like a huge arm. Its cutter swoops in and out at the touch of the joy stick control. The direction in which the stick is pushed is the direction of the head movement. The harder the push the faster the movement.

This unusual feed drive is made possible by a Reliance V★S Drive. Two 7½ hp. Variable Speed D-c. Motors, one each at shoulder and elbow, provide the flexible arm-like feed movements. The motors are controlled and directed by the joy stick.

The result is an extremely compact and versatile feed drive that gives eye-popping performance. Economical in original cost, these Reliance Drives will provide years of steady service with little maintenance.

If you are designing, building or buying machine tools, it will pay you to check the economies of Reliance Variable Speed Drives. A-1518

Write for Bulletin D-2311

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RELIANCE ELECTRIC AND ENGINEERING CO.

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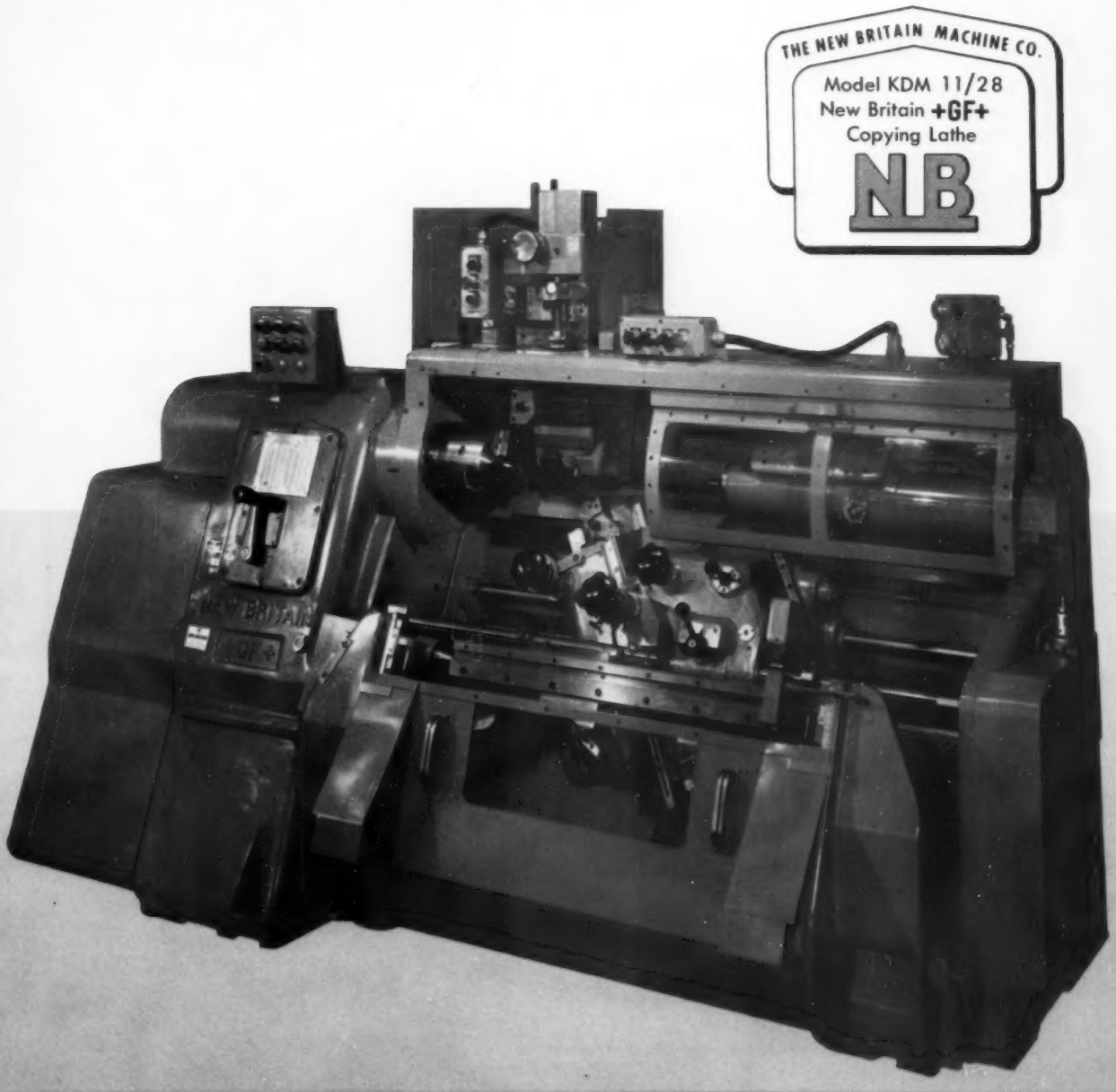
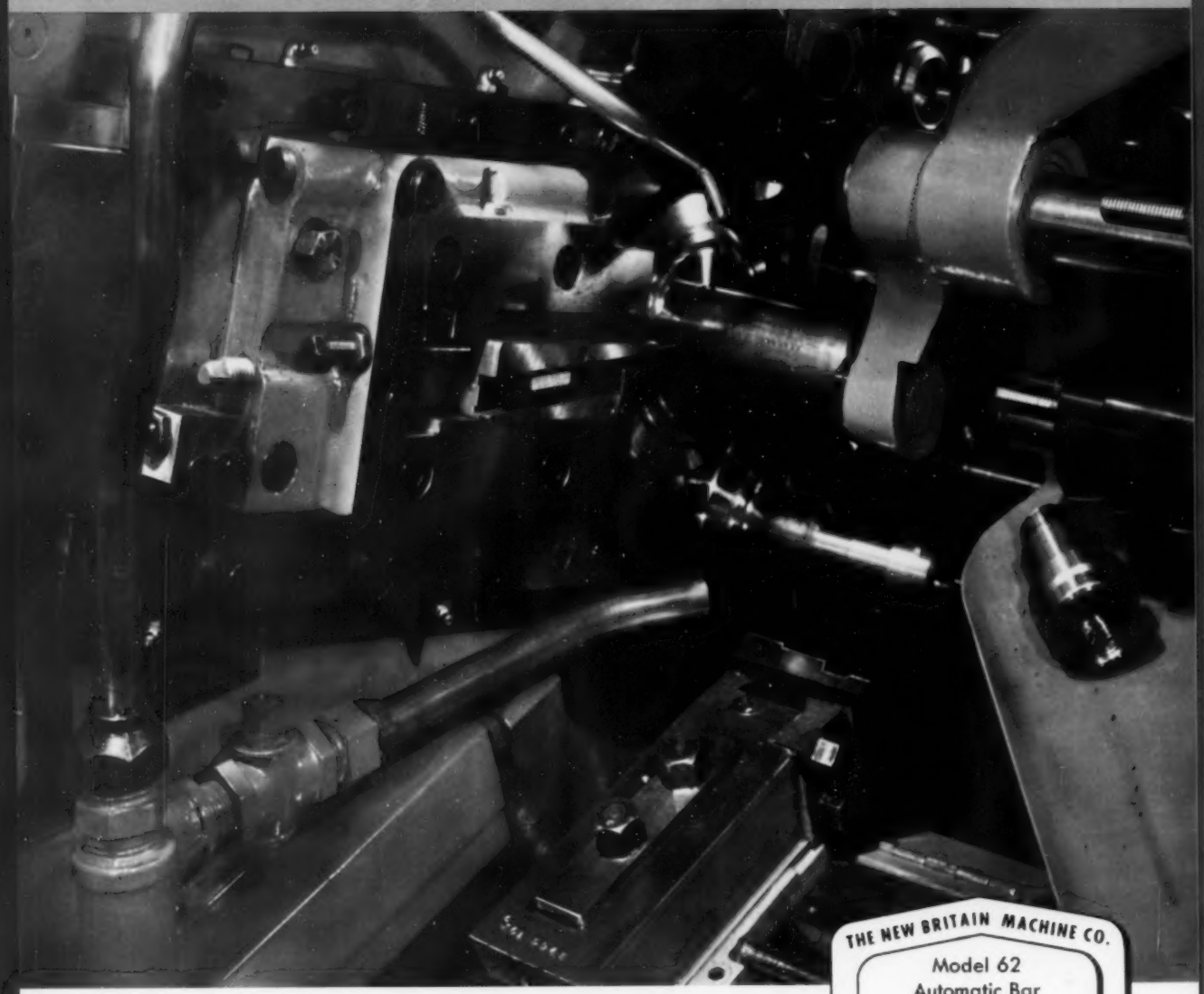
You'll find New Britain +GF+ Copy Lathes are turning out pieces at profit. With a 15-minute setup on a standard model to make just a few pieces, or with an automatically loaded production model to run a million a year, the New Britain +GF+ approach can make money for you. For a complete color motion picture demonstration in your office, consult your New Britain representative or write The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.





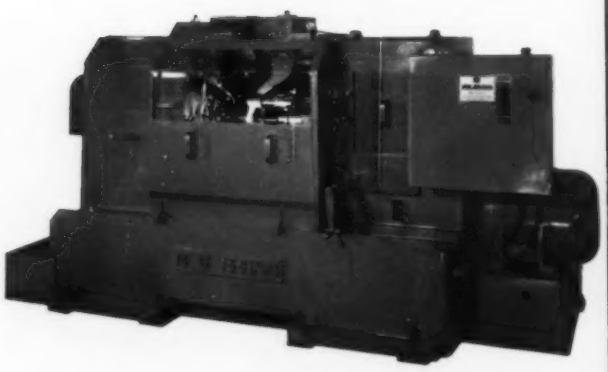
THE NEW BRITAIN MACHINE CO.

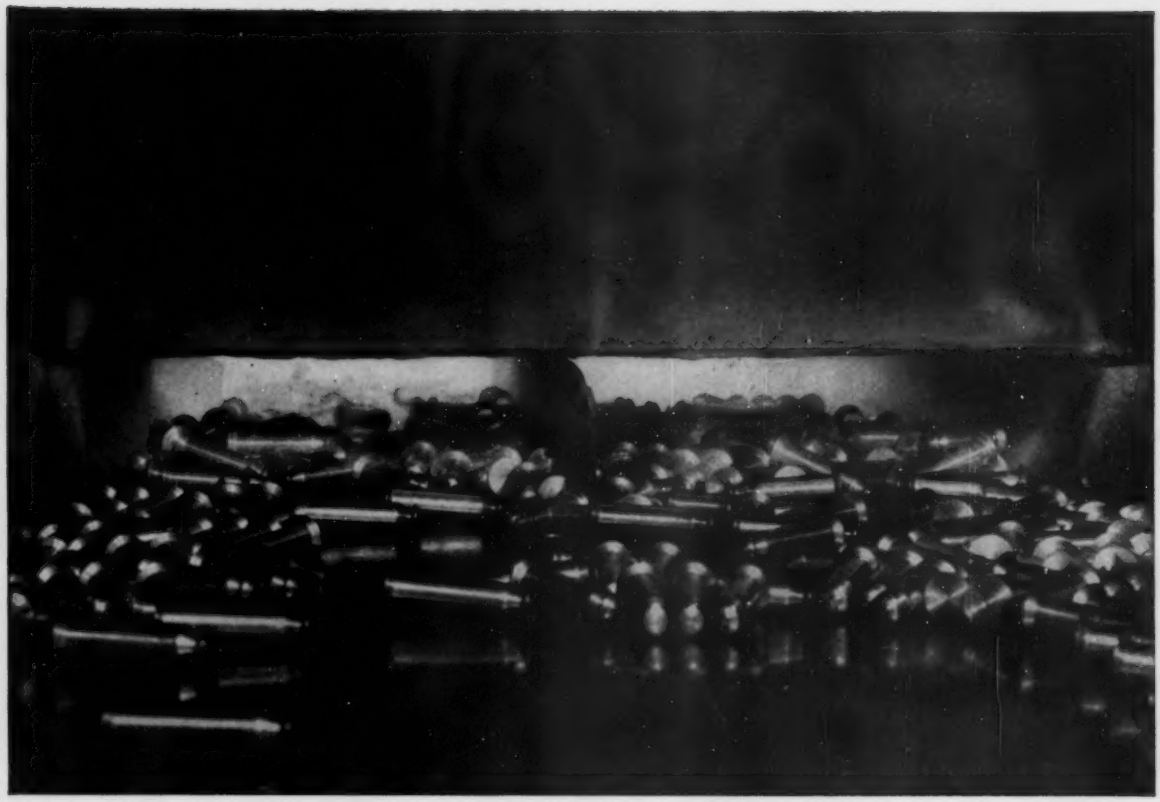
Model 62
Automatic Bar
Machine

NB

a rugged cross slide in every position

New Britain Models 60 and 61 Automatic Bar Machines are everywhere you turn. The new Model 62 represents new progress in rugged construction and versatility of setup. Your New Britain Representative can show you how to modernize at a profit. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.





No More Scaling Here.....
Despite Severe Oxidizing Conditions

A vibrating chute made of a HAYNES high-temperature alloy solved a tough maintenance problem in this heat-treating furnace. The chute spans the entrance to the furnace and is subjected to severe oxidizing conditions. Other chutes became loaded with heavy scale in a few months' time and had to be repaired or replaced. Now that the chute is made of a HAYNES high-temperature alloy, there is no more scale. Parts keep flowing along freely, rejections are way down, and maintenance has been practically eliminated.

There are 11 HAYNES high-temperature alloys. All have excellent strength at elevated temperatures, good creep and stress-rupture properties, and are extremely resistant to oxidizing or reducing atmospheres. One of them may be the answer to a production or maintenance problem in your plant.

For information on prices, sizes, and properties of these alloys, write to our general sales office in Kokomo, Indiana, or to any of the district sales offices listed below.

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Wheeled chairs get stiff workouts in fast-moving paraplegic basketball. Tubular construction keeps them strong, safe, maneuverable. When it's moving, make it steel tubing.

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Construction is STRONGEST!

At any given weight, tubing is strongest of all mechanical shapes . . . stronger under compressive load . . . stronger as a beam . . . stronger in torsion.

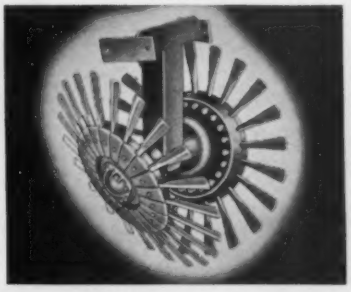
And, dollar for dollar Republic ELECTRUNITE Steel Mechanical Tubing is your best buy. ELECTRUNITE is the original electric resistance welded tube. It's the quality tube of industry, available in a wide variety of forms, sizes and gages . . . in both carbon and stainless steel.

For volume production, ELECTRUNITE tubing is consistently uniform, foot to foot, shipment to shipment. It offers uniform wall thickness and concentricity. Surfaces are free from scratches and pit marks. It offers uniform response to heat treatment. It is easy to fabricate . . . often eliminates some costly fabricating or machining operations.

When your product must be strong, safe, lightweight, investigate Republic ELECTRUNITE Steel Tubing. Republic engineers can help you design it into your products and processes, economically and profitably. Send coupon for facts.

MORE REPUBLIC PRODUCTS MADE FOR MOVEMENT:

"I PUT REPUBLIC NYLOK NUTS TO THE TEST every time I ride my Taylor Tot," reports this young test driver. In spite of all the bumps, bounces and jolts, Nylok Nuts always hold tight. The reason: a special Nylon plug that assures positive locking in any position wherever you stop wrenching. Send coupon for details.



THESE BEET DIGGER TINES ARE 34% STRONGER since John Deere switched to alloy steel. Originally fabricated from carbon steel, they would sometimes break under stress. By taking advantage of alloy's hardenability—plus superior strength—bending and abrasion problems have been eliminated. Send coupon for complete data on Republic Alloy Steels.

DOUGLAS AIRCRAFT ADDED A PASSENGER—AT NO INCREASE IN WEIGHT on their new DC-7 superliner. How? By substituting Titanium for other metals normally used in nacelle construction. Republic is an old hand at this high strength-to-weight business. Send coupon for information on how Republic Titanium and Titanium Alloys may help your product.

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the steel you want ...when you want it

Prompt delivery is but one of the many services offered by your J & L Warehouse . . .

Put our complete facilities to work for you—for example, take advantage of our large stocks of cold finished steel in a diversified range of sizes and analyses. Let us serve *all* your requirements for steel quickly and efficiently.

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The Department Store of Steel

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Here's a drum that can't be beat!

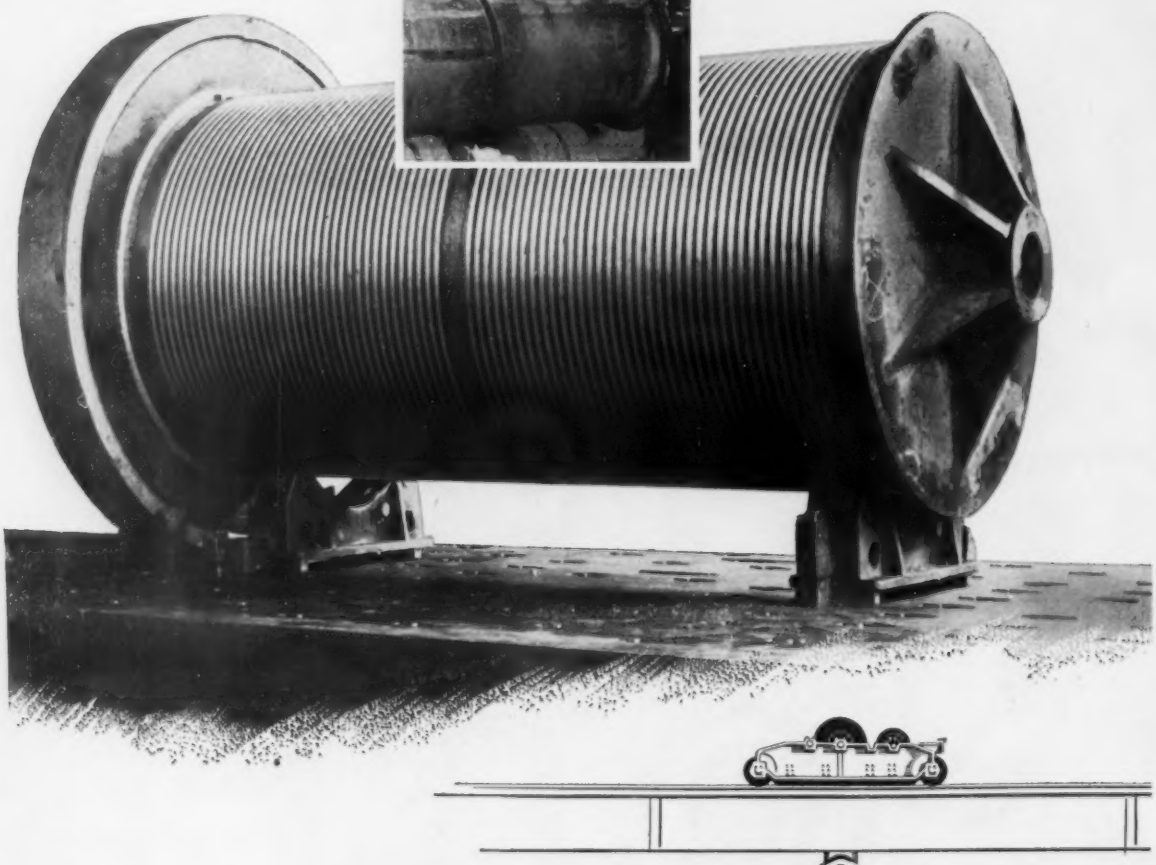
• *Fabricated drums* in Morgan cranes are structurally stronger than cast drums . . . yet they weigh less.

Automatic welding of Morgan drums with the world's largest continuous welding machine assures uniform, sound joints and seams.

Crane girders, too, are welded automatically, making them stronger and lighter. Morgan welders are qualified in accordance with A.S.M.E. and A.W.S. codes.

Performance records prove conclusively that Morgan cranes are the best in the business . . . cost less to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!

Automatic welding speeds up to 120" per minute are achieved on Morgan's continuous welder. Perfect welding penetration assures uniform, strong welds.



The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

A plant manager asks 3 leading questions about V-belts

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With *four* 100′ reels of Veelos (O, A, B, C widths) you can replace as many as 316 different sizes of endless belts —and store your Veelos in *inches of space!* Veelos cuts your inventory to a minimum. No obsolescence or deterioration, no worries about specific sizes. With Veelos, your storage and inventory problems are licked!

2 "How does Veelos cut installation and down-time?"

Veelos is an *adjustable belt.* With Veelos, there's no tearing down outboard bearings, no resetting, tilting or moving motors to make belt replacement or repairs! And you don't have to replace a complete matched set because of one loose belt—Veelos belts adjust to any length, can be altered by adding or removing links!

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Install Veelos in place of ordinary belts! Veelos belts are absolutely uniform; every stud and link is identical; every foot of the reel is identical and uniform; they're perfectly balanced. Your Veelos salesman can easily prove to you with a Veelos Vibration Analyzer (tested against any V-belt you might now be using) that Veelos *cuts vibration up to 90%!*

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THE BALANCED
LINK V-BELT

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Adjustable to any length • Adaptable to any drive • Balanced power • Constant power • Vibrationless power

NEW "Unionmelt" Welding Assemblies

for greater job versatility- performance dependability

Versatility and dependability are yours at an all time high in an improved new line of UNIONMELT welding assemblies . . . These units embody the greatest variety of machine combinations, job applications, and design features ever offered for submerged arc welding.

Wire feed units are simply constructed and are highly efficient . . . Identical mounting dimensions for heads, brackets, and slides allow for any number of desired assembly combinations.

Welding heads have exceptional flexibility because of sturdy new mounting fixtures which provide for vertical, horizontal, and rotary adjustment. Stationary and self-propelled combinations are also available.

The wide variety of standard and custom UNIONMELT welding assemblies can easily be made to fit your particular applications—at costs lower than many current standard models.

See your local LINDE *representative today for information on the many other new features—or write for free illustrated literature.*

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A Division of Union Carbide and Carbon Corporation
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Roebling drum packs are shipped on pallets unless otherwise specified. This gives you today's easiest, least expensive method of moving and stacking wire — with a fork truck, one man can do the work of ten.

Packed to save you money!

IN ADDITION to producing top quality high carbon wire, Roebling has developed many special methods of packing ... and some *one* of these, or some other method which may be developed for your specific requirements, may save a considerable amount of time and money in your plant.

Certain types of wire, for instance, can be packed in hexagonal fibre drum packs that provide superior protection and facilitate handling and storing wire. Drum packs do not have to be returned ... save you bother, storage space and freight charges.

You *pay* for the best when you buy high carbon wire. Make sure you *get* the best, in wire and packing too. Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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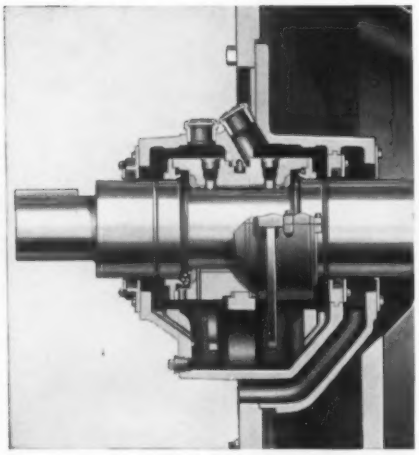
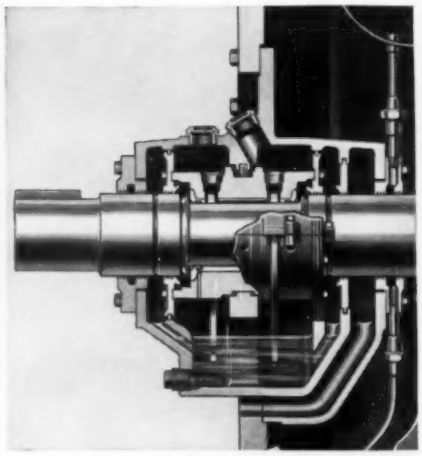
If you wish, Roebling spools will be delivered on pallets with separators, providing the easiest and most economical means of handling and stacking wire with fork trucks.

NEW Bearing Design Means Better Motor Performance

Allis-Chalmers capsule-type sleeve bearings now perfected for complete motor line



Standard capsule-type sleeve bearing



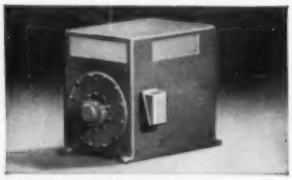
High speed capsule-type sleeve bearing

A new feature—an improved capsule-type bearing design—has been added to the Allis-Chalmers complete line of large end-shield bearing motors. This new bearing will give you better motor service, simplified maintenance and longer motor life through features like:

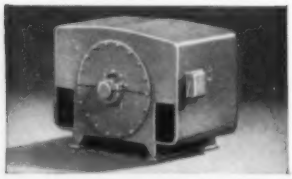
- Dust-tight, leakproof enclosure protects bearing from dirt, dust or abrasive materials.
- Venting system prevents oil leakage — keeps oil and vapor from getting into motor enclosure.
- Dual oil-rings insure bearing surface lubrication — either ring can adequately lubricate bearing.
- Split end-shield gives easy accessibility to winding and air gap — without disturbing capsule or bearing alignment.

Drip-proof or splash-proof cage motor

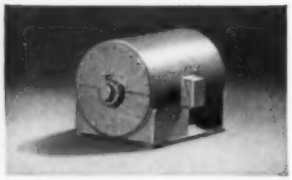
Synchronous or wound-rotor motor



High speed cage motor

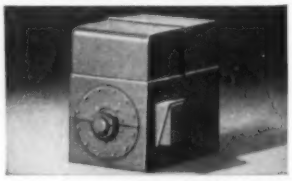


Weather-protected motor



Totally-enclosed fan-cooled motor

Totally-enclosed forced-ventilated motor



Water-cooled or inert-gas-filled motor

Capsule-type bearings are standard on these Allis-Chalmers motors.

You get MORE from Allis-Chalmers motors

More design and construction features — more application help. For complete information, contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

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NEWSFRONT

High Cost of Obsolescence

Obsolescence of Army materials in fiscal 1958 figures to put a bigger bite on taxpayers than proposed 10 pct budget increase Army is gunning for for that year. Based on this year's roughly $7.5 billion budget, 10 pct bump means an extra $750 million shelled out. What's annual obsolescence rate? More than $1 billion—or 4 pct of the $25 billion in equipment, supplies currently issued or stored.

Precalculated Super Alloy

A new super alloy, composed principally of nickel and cobalt but containing small amounts of five other elements as well, was developed by a new metallurgical research lab technique. For use to 1200°F, the alloy will find application in high-temperature steam turbine blades. Discovery of how to control magnetic structure for desired mechanical properties permitted predesigning the material for high-heat strength, ability to resist mechanical vibration.

Bomb Shelter Program Working

Federal, state civil defense officials are lobbying hard for program to build $12 billion worth of defense shelters. Their argument for the four-year program: both U. S. and Russia will have intercontinental missiles by 1960—shelters must be ready. Besides the steel and concrete structures, costing $100 per person, the group is pushing for large-scale stockpiling of food and clothing.

Extrusion: Picking Up Steam?

Progress in two important cost areas should lead to faster growth of both hot, cold extrusion of metals, an expert feels. Two areas are Government supported heavy press programs for aircraft extrusions and inspection techniques. First, spokesman says, brings more scientific formulas into die design practice; second results in improved techniques to catch flaws in steel billets before they're machined into costly die components.

More Stable Zinc-Rich Paints

Wider use of zinc-rich paints (95 pct zinc pigment in the dry films) as anti-corrosive materials seems likely with development of a method for holding dispersion better. Method, maker reports, prevents settling out of heavier metal constituents on standing; difficulties of remixing into smooth suspension. They're claimed to protect galvanically just as hot-dipped and electroplated zinc coatings do.

Spelling Out Requirements

Defense agencies this year are tabulating raw material requirements by commodity and amount, for first time since Korea. Purpose: partly to find which materials are most used, or where the money goes; also to serve as basis for further studies on emergency capacity. Area steel men will watch most closely—hot top steel requirements for billet and plate, from which most artillery ammunition is now produced. This has been a bind before.

Farm Equipment Upturn Due?

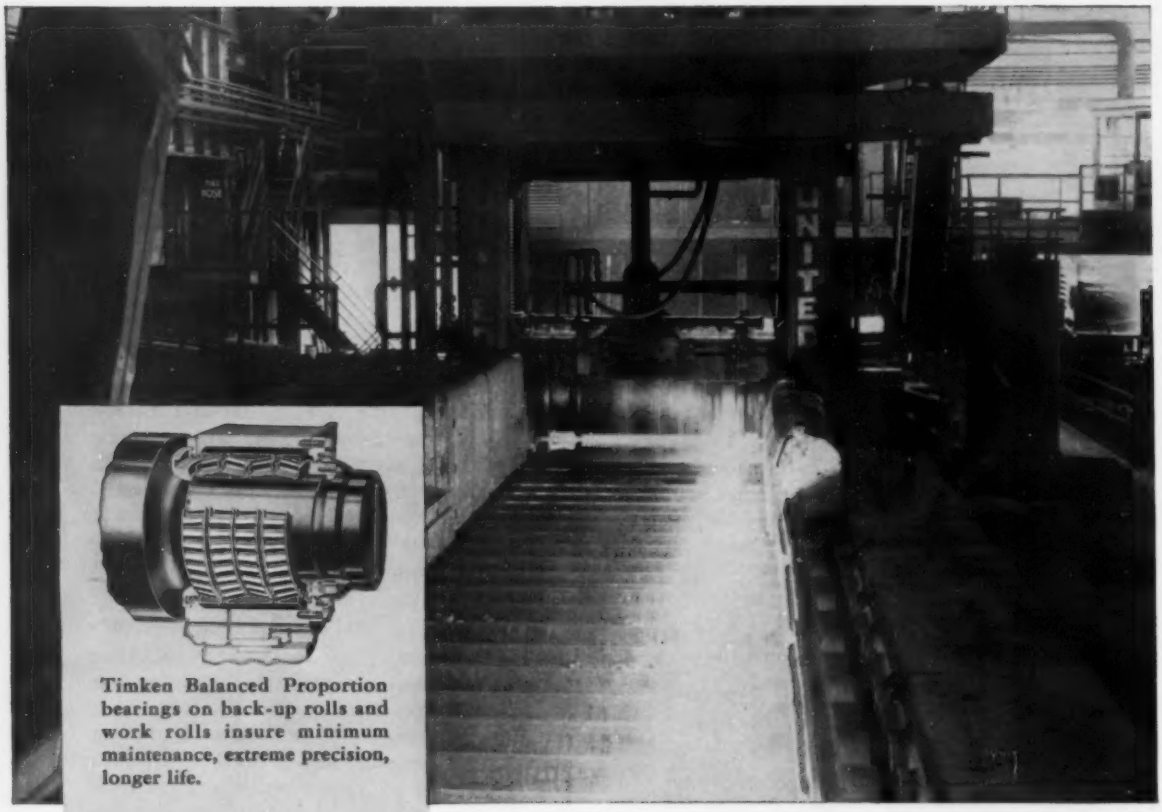
Second-half farm equipment sales are worth watching closely. Producers in Canada, where a slow spring affected the farm buying outlook even as here, now report levels exceeding their most optimistic estimates of three months ago, It's quite possible that at least one Canadian producer may revise his production schedules upward soon.

Second Primary Magnesium Producer

A new primary magnesium producer will be in the field soon. Plans for construction of a plant are reported in final stages, with full production expected by fall of '57. A trade association spokeman now arguing in Washington for increased magnesium stockpiling plans to mention the development in combatting 'one-producer' objections.

Pedestrian's On Way Out

Number of automobiles in operation by 1980 is forecast by one leading producer at 88 million. This compares with today's 52 million. Average hp will climb too—from 180 to 250. Pounds of aluminum per car will jump from 35 lb in '55 to 200 lb in 1980.



Timken Balanced Proportion bearings on back-up rolls and work rolls insure minimum maintenance, extreme precision, longer life.

2-high bloom and slab mill starts faster, drives easier on TIMKEN® balanced proportion bearings

WITH the roll necks on this 2-high bloom and slab mill—built by United Engineering & Foundry Company for Pittsburgh Steel's Monessen, Pa., plant—mounted on Timken® balanced proportion bearings, friction is practically eliminated. This means lower starting resistance, faster acceleration, easier roll drive and higher rolling speeds. And because the balanced proportion design of Timken bearings permits larger diameter roll necks with no increase in bearing O.D., roll neck strength is increased up to 60%—load ratings up to 40%.

No special thrust bearings are needed; Timken bearings take radial and thrust loads in any combination. And full line contact between the rollers and races of Timken bearings gives them extra load-carrying capacity. Complicated lubrication systems are eliminated, too; Timken bearings permit simple, economical grease lubrication. Rolls can be changed quickly and easily. Wear is greatly reduced, long life is assured. Timken bearings are designed geometrically to *roll true* . . . and are precision-manufactured, under the most rigid quality controls, to conform to their design. Timken bearings show lowest cost per ton of steel rolled.

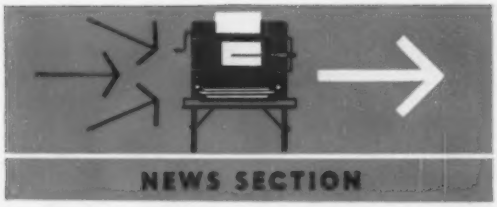
Always specify Timken balanced proportion roll neck bearings. For full details, consult our roll neck specialists. Write to: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.

▶ For latest steel labor developments see P. 124



LABOR: Small Business Is Forgotten Man

Steel labor settlements impose double-edged burden of higher wages and prices on small business . . . Proposals to ease pressure . . . Industry must resume labor relations leadership—*By Harold J. Ruttenberg.*

◆ AFTER 20 YEARS, the Steel Labor collective bargaining show cries out for a new script.

When I was an official of the United Steelworkers of America I wrote that union action and policy basically was a reaction to what management said and did. With ten years of management experience I believe this now even more firmly. Basic leadership lies with industry, whose policies shape union actions.

A two-decade chain reaction characterizes labor-management policies today. My point is this: By aggressive leadership, industry can set in motion a new set of chain reactions that will lead unions to the higher plateau of cooperation with management to enlarge the total size of the corporate pie. Strikes over the proper distribution of the pie would then be replaced by long-term agreements.

I may be a voice crying in the wilderness, but as the president of a small metalworking company I have grown weary of my perennial role in the unhappy last act of the Steel Labor Frolics.

What's The Answer?

I'm the voiceless "middle man" in these jousts between big steel and big labor. I'm caught in the cross-fire of higher steel prices and higher wages for my employees. And when the battle rolls on, I'm left to patch up my own wounds—or bleed to death.

It doesn't ease the pain to know I have plenty of company. It's just as hard to nurse my ailing profit and loss statement back to life and just as distressing to hear the anguished groans of my customers when they get the sad news that I have to raise prices.

Is there an answer to my dilemma and that of other small business men in similar straits? There is. But big labor, big steel, and big government will have to compound the prescription. (See page 28.) Meanwhile, some of the patients are dying of financial anemia. Others are in their graves.

While most of us — someway, somehow — find ways to absorb some of the higher costs and pass some on to our beleaguered customers, increasingly at the end of every price-wage spiral more small firms are dying or selling out.

I have not prepared a statistical document proving this conclu-

This is Harold J. Ruttenberg:

WITH INDUSTRY

◆ Mr. Ruttenberg left the United Steelworkers of America, successor to SWOC, in 1946 to become vice president and director of Portsmouth Steel Corp. After three years, he formed his own company, Harkit Corp., and subsequently became president of Stardrill-Keystone Co., Beaver Falls, Pa., manufacturer of cable tool and rotary drilling machinery.

◆ Mr. Ruttenberg, 42, is co-author of "The Dynamics of Industrial Democracy," and has contributed to national magazines on labor-management.

WITH LABOR

◆ After graduating from the University of Pittsburgh, Harold Ruttenberg went to work for the Steel Workers Organizing Committee as director of research. From 1936 to 1946 he had a front-row seat during organization of steel and subsequent consolidation of union gains. For two years of this period—1942-44—he was assistant director, Steel Division, War Production Board.

sion, but as a former professional statistician, I could. And if some juggler of figures tries to show that there are more small metalworking firms (in physical units of output) now than existed in 1936, I shall put back on my statistical fisticuffs and knock him to Kingdom Come.

Am I trying to say that this wage-price squeeze means that small business is on the way out? Far from it—providing big labor, big business, and big government adopt some reforms for the general welfare of small firms. We need a steel labor policy for small business.

A few days ago one of the small business associations solicited our membership, and enclosed a senator's speech quoting the Teamsters' Jimmy Hoffa in the March 4, 1956, St. Louis Post-Dispatch: "The future of labor-management relations is big labor and big business, for there is no room for the small business or the small union."

Jimmy Hoffa is full of prunes. Small metalworking firms are here to stay.

The Big Picture

While the accumulating evidence points to the diminution of small companies, you must look at the problem in perspective. True, the big firms are getting bigger, and they are doing a larger percentage of the total industrial business. It is correct that the nature of the new technology requires large aggregates of capital to exploit it. To conclude from this, however, that "there is no room for the small business or the small union" is, in my opinion, a careless judgment.

The reason: there will always be plenty of those courageous souls blessed with that indefinable something that makes them want to strike out on their own. As long as freedom of action and sources of borrowed capital exist in this country, there will be small business, and specifically small manufacturing and metalworking companies. But, again, only if the "Big Three" lend a helping hand instead of pulling the rug.

Before giving a few examples of how small business can be forced to the wall by unrealistic union economic pressure, I would like to point out that—as my few readers and fewer friends know—my combined labor union and industry management experience has not made a partisan or apologist out of me. Instead, I am trying hard to evaluate all facets of the labor-management relationship objectively, and to formulate improved patterns of industrial relations.

Horrible Examples

My experience with small firms began in 1937. The first union contract that I negotiated for the

Ruttenberg: How "Big Three"

STEEL:

◆ The biggest help steel producers can give us is to increase their capacity so that on those rare occasions when we can sell all we can make, we will have the steel to keep our lines running at capacity. By sharing in the boom, we will be able to take care of ourselves when the steel wage-price spirals roar at our doors. I realize the mills are trying to do this, and I am sympathetic with their problem of financing the necessary expansion.

Another aid would be for our steel suppliers to finance some of our steel inventories. I suggest that our steel suppliers ship us steady tonnages monthly that we can put in a public warehouse and pay for on 90- to 150-day terms. I think that the cost of such financing, part of which we would pay, would be much less than the cost of steel operations fluctuating radically over relatively short periods of time.

LABOR:

◆ Dave McDonald should follow the lead of the U. S. Government and create within his union a Small Business Department. The basic operating policy of this proposed union department should be that the best interests of the union members working in small plants are served by promoting the welfare of their small employers.

Ruttenberg: How Small Business Can Help Itself

■ "I remember in 1937 how U. S. Steel conducted seminars for smaller firms, instructing them in the terms of its new union contract. Too many small firms have since been waiting each year to follow U. S. Steel's lead.

■ "The time has since passed for severing this umbilical cord. The biggest help small companies can get in their labor contract problems is a divorce from the U. S. Steel negotiations.

■ "I propose to negotiate our own problems with our contracting USW union, and to do so at different times than U. S. Steel. The USW, in my experience, is willing to deal independently with small companies who take the initiative.

Steel Workers Organizing Committee (predecessor of the USWA) was with a small structural steel fabricator on Neville Island, near Pittsburgh. The poor distressed owner argued against paying the 10-cent wage pattern established a few days earlier in the new U. S. Steel contract. Then he left the office for a walk around his shop and yard. Upon his return he argued no more but signed for the dime, which was about a 20 pct increase.

A few months later, the company went out of business. The shop leader of the local union soon became an organizer and I think he is still on the staff of the United Steelworkers of America.

Soon thereafter I negotiated a contract with a company in McKees Rocks, Pa. During the organizing period the company had raised wages a nickel, and I argued with the local union to ask only for the other half of the dime. But they insisted upon ignoring the nickel raise. However, I got them to agree to ask for the dime, with the understanding that if the company held fast for only a nickel to agree to it instead of striking. To my surprise the company agreed to another dime increase in the first meeting. A few months later they went out of the metal furniture business.

Then there was the gruff, angry man in a downtown Pittsburgh office building who told us union negotiators to go to hell and

Can Help Small Business

Another policy USW should adopt is to supplement automation with "humanation." A major weakness in union policy is too great a reliance on the ability of industry to increase productivity by technological measures. As a result, the union assumes that industry will be so successful with automation that full union demands can be won each contract time. Later, if not in 1956, the USW will learn that even the big companies are unable to create mechanical and electronic ways of upping output fast enough. And certainly the small firms cannot.

To supplement this deficiency, a policy of humanation is essential: namely, the full release of the human creativeness of the working and managing forces, in joint cooperation, to increase efficiency, reduce costs, eliminate waste, and raise quality.

I am sympathetic with the desire of the union to raise its members' living standards, but this can only be done by helping to produce more.

GOVERNMENT:

◆ That 52 pct tax rate is just too much. Until a firm acquires a million dollar net worth, its maximum tax rate should be 25 pct, and graduate at 5 percentage point intervals until the firm has a net worth of $2.5 million, at which level the 52 pct (or then prevailing top corporate rate) will obtain. This idea has plenty of facets that would have to be worked out, but it is a basic essential for the small firms.

Another aid would be drastic reduction in inheritance taxes on small family-owned firms that stay in the family.

These are a few basic steps which the "Big Three" could take to make small business's lot a little easier under today's conditions.

INTERNATIONAL

BEACHHEAD:

Team of scientists set to probe European research.

A pioneer mission of five technologists will strike out July 21 from Chicago's Armour Research Foundation for the European mainland. Their goal: to establish an informational beachhead in The Hague, Netherlands.

An electrical engineer, a chemical engineer, a mechanical engineer, a chemist and a metallurgist, sponsored by (thus far) 18 U. S. industrial firms under auspices of Armour Research, will set up a listening post in Europe.

They will sift through literature and tour European seminars, technical society meetings, conferences and trade shows. They plan to visit European laboratories and plants, as well as review foreign technical publications, patents, and any other sources of new industrial methods and research.

Each of the five technologists is assigned four non-competing U. S. companies, which will subscribe to his services.

First Wave

Armour limited each technician's sponsors to four non-competing firms, particularly in metalworking where widespread diversification complicates the job of selecting non-competitive companies.

One thing seems certain. The initial party of five is a landing force only. Armour is already indicating it may increase the original five specialists to add other technicians, each backed by four sponsoring and non-competing firms. Each sponsor signs for two years of the service. Suggestive of a strong future for the idea is the fact that the Dept. of State and U. S. Dept. of Commerce have already shown interest.

Among the original sponsors: Powers Regulator, Aro Equipment Corp., Warwick Mfg. Co., International Minerals & Chemical Corp., Caterpillar Tractor, Amphenol Electronics Co. and Texas Instrument Co.

Battelle has maintained research facilities on the European continent, so that U. S. observers on the European scene are not new. But the two-year personalized contact between observer and sponsor is an added wrinkle.

■ **SPECIAL REPORT** *Continued*

liquidated a not-too-small tube mill in Ambridge. I think the year was 1938.

I shall never forget a strike of can workers, mostly girls, in Maspeth, Long Island. We got them a wage raise and back to work. But the brother owners of the plant were hysterically raging and running all over the office. As a young 24-year-old boy, I could not understand their lack of self-control. But I think that today I have at least an inkling of what was disturbing them. Their can company soon sold out to one of the big companies.

Then there were the small drum and barrel manufacturers, who soon after the 1937 steel wage negotiations began to sell out so fast to the big steel companies that, as a record-keeping union statistician, I had a hard time keeping my files on them up to date.

I personally spent long hours at the McKeesport Tin Plate plant in the 1938 downturn, and talked the men into taking a wage cut. But the continuous strip mills ran over them, and the plant was converted to making bombs a few years later. I also supervised negotiations with the several small wrought iron plants in the thirties and early forties, most of whom have folded their tents. Technology had hardened their arteries, and the union wage contracts induced the fatal heart attacks.

Sink Or Swim

Since March, 1951, I have been running a small machinery manufacturing business, and while I have almost choked to death on a couple of the price-wage spirals through which our country has passed in the last five years, we are still doing business at the same stands. Only time will tell how many more we can digest.

In 1956, like most previous years, the total percentage increase in our steel and other materials and supplies and wages will almost add up to our profits before taxes. We must find cost cutting ways of absorbing some of these higher costs, and we must sell our customers on paying some of them or go into the red.

While we have a lot of company among the small firms who are in the same fix, this is little comfort and of no practical assistance. Like our fellow sufferers, we must work out our own problems in our own way as best we can. Our alternatives are all the same: keep struggling on our own, throw in the sponge, or sell out.

A few months ago one of our casting suppliers talked to me about his labor situation, and he said: "I can always sell out." A few weeks later I received a notice that he had. He was earning only 6 to 7 pct before taxes, and just did not feel it worth while to go on for such a small return.

Ray Of Hope

The legion grows from year to year, and the 1956 steel wage settlement will accelerate the trend.

It is hard to believe that either the big steel firms are oblivious to our plight, or that the unions would just as soon see us fold our tents and disappear under the auctioneer's hammer or into a captive division.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

CONTINUOUS CASTING: A Horizontal Step

Vacuum pouring and horizontal casting make debut in nonferrous field . . . Scovill orders production machine for rounds and strip . . . Slab casting machine under study . . . Possibilities for steel—By G. G. Carr.

◆ CONTINUOUS CASTING is poised to take a giant step. The stride may be incorporation of the effect of vacuum pouring into the continuous casting process. And a bonus step is the shift from vertical to horizontal casting equipment.

A prototype of the horizontal continuous vacuum casting machine has been casting aluminum rounds for some time at Southern Electrical Corp., Chattanooga, Tenn. And Scovill Manufacturing Co., has a larger unit on order, hopes to start continuous casting of rounds and strip at its Waterbury, Conn., plant this fall. Also in the works at Scovill for a later date is a slab casting machine.

A pilot steel casting machine is now running at United Steels in England, and Alloy Steel Corp. of Germany has a production model under construction.

Compact in Size

Whether for steel or aluminum, the machine is compact, with present models about desk-top size. An air-tight spout carries molten metal to the tundish, then to an oscillating, water-cooled copper mold about 3 ft long. A small vacuum pump and motor maintain a vacuum in the mold of about 20 in. of mercury. Two new features are the sealed spout leading into the tundish, which eliminates the need for an inert gas atmosphere around the tundish opening. Other new device is the use of water sprays to seal the exit end of the mold. The water turns to steam at point of contact, providing back pressure.

Machine was originally developed by Albert H. Tessman, vice-president, Southern Electrical Corp., in conjunction with Irving Rossi of Continuous Metalcast Co. of New York, after tests on another casting machine failed to provide aluminum of sufficient quality for electrical power transmission lines. Rights to the machine are controlled by Continuous Metalcast.

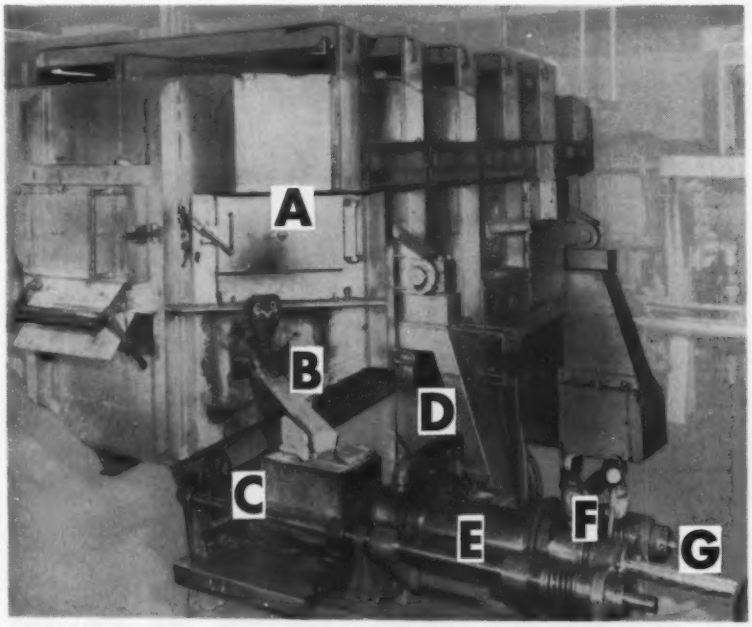
Southern Electrical started looking into continuous casting because it felt that an aluminum wire rod cost of 6 cents per lb shaved its profit margin too fine. The company reports that its continuously cast product is cheaper.

No Size Limit

And Continuous Metalcast's Irving Rossi says he sees no theoretical limit on size. He is confident that vacuums of the level now used for vacuum pouring of steel can be obtained simply by more powerful equipment.

Mr. Rossi says that present vacuum levels produce high purity aluminum and raises the question of what effect such vacuums would have on steel. Nobody suggests that the latest development has solved all the problems of continuous casting and/or vacuum melting.

Horizontal Continuous Casting



HORIZONTAL continuous casting machine shows (A) aluminum melting furnace, (B) sealed spout, (3) tundish, (D) oil line, (E) water-cooled oscillating copper mold, (F) vacuum pump and motors, (G) cast aluminum round moving through cut-off saw toward homogenizing furnace.

MERCHANT WIRE: Sales Climb With Heat

Delayed seasonal demand picks up dormant market . . . Backlogs now exist where next week delivery was the rule . . . Last year's shipment figures may be challenged . . . Some strike hedging apparent—By *T. M. Rohan.*

◆ MERCHANT WIRE products salesmen are finding there was nothing wrong with their markets this year that a little warm weather couldn't cure. Like auto salesmen, clothing retailers and picnic suppliers, their sales have been only about average until the last six weeks. Now things have caught fire in earnest.

A delayed seasonal demand has been materializing into a flood of orders from the farm country which is ricocheting to dealers, to jobbers, and back to the producing mills. On top of this, distributors did some price-strike hedging which market analysts say accounts for about 25 pct of the additional increase in orders.

Changing Sales Pattern

Last year barbed wire fencing hit its peak in March when it represented 16.4 pct of the years shipments. This year the peak came in late May and June.

Regular fencing has followed almost the same pattern. Shipments rose moderately in March but June this year is ahead of a year ago. And order intake is far ahead.

Backlogs have lengthened. Until May, many orders which came in near the end of the month were shipped the same or following week. In May incoming orders skyrocketed and pushed delivery dates into June. Now July delivery is being quoted and despite the expected price increase, mill schedules are almost filled. The strike at Tennessee Coal & Iron Div., U. S. Steel, has helped maintain northern production of merchant products such as nails, fence and barbed wire, which are being shipped south.

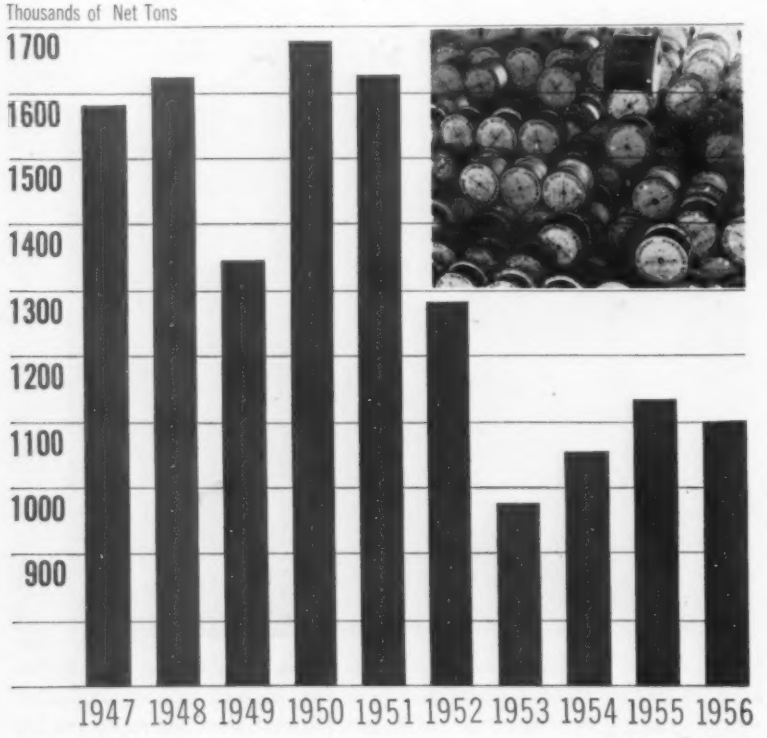
The delayed demand for merchant products has brightened the outlook for the year as a whole. It is expected this year U. S. shipments of merchant wire products will be only slightly short of last year's total of 1,136,875 tons. In Korea years, defense uses raised totals. Postwar demand also sustained high levels.

Foreign Influx

And this year's improvement will be in spite of a heavy influx of foreign barbed wire. These are currently penetrating the entire country, including such inland points as Missouri and Kansas, delivering at an average of $30 per ton less despite high freight costs, and import duties. Total market consumption will probably be well over last year when the imports are counted in. Some wire authorities believe foreign barbed wire is running at least 45 pct of total U. S. consumption.

Another bright spot is welded wire fabric which is booked to near capacity for the season and is still on an allocation basis. Big demand is from roadbuilding and construction. Fabric-making capacity of over 100,000 annual tons is being installed across the country. This

Wire Shipments Pick Up



Source: AISI

1956 = Estimate

will bring industry capacity to almost 600,000 tons in a seasonal market which will hit about 650,000 tons.

In contrast to the comeback on merchant products, outlook on other wire and strip products remains only so-so. Demand for strip remains depressed because of automotive sales slowdown. No substantial improvement in industrial activity is expected before September.

Hot rolled strapping, nail wire, and wire rod sales are holding up well. Railroad car building and the construction industry are comparatively strong. The bedding and furniture business are only slightly weak. Fastener demand is off except where involved in the jobber trade which is doing some price hedging.

Parts Inventories Up

The growth of the auto industry in the past 10 years has forced auto manufacturers to increase their parts inventories by as much as 400 pct, according to Paul E. McCracken, manager of Buick's parts and accessories department.

Buick's inventory has increased from 3.5 million to 15 million parts since 1946.

The increase reflects a corresponding jump in the sales volume of replacement parts. Sales in the industry as a whole have increased nearly 150 pct since the prewar days. They have jumped from $.7 billion in 1941 to about $1.7 billion in 1955.

The big problem, as far as Buick is concerned, is that 75 pct of the 30,000 different parts kept in stock are seldom called for. Some 22,000 parts account for less than 1 pct of Buick's total parts business. About 95 pct of dealer volume comes from only 2700 of the total parts Buick carries.

The scrap problem for obsolete parts is one of the biggest headaches for both auto manufacturers and dealers.

Buick tries to avoid this as much as possible. It has a plan to assist dealers in determining the size of the parts market.

The plan helps keep down the scrap rate and also prevents a dealer from having his money invested in dead stock.

MANUFACTURING

FORGING: Bigger Than Ever

Alcoa says it is making world's largest closed die forging . . . Claims world's largest dies were made for its production . . . Part is airframe component.

◆ ALUMINUM CO. of America claims a number of world's firsts, in connection with production of an aluminum closed die forging to be used as part of the airframe of the Martin XP6M SeaMaster seaplane.

Alcoa says the 13-ft long forging is the largest of its type ever produced.

Before the part could be pressed, Alcoa reports its Cleveland works die shop had to sink the world's largest dies.

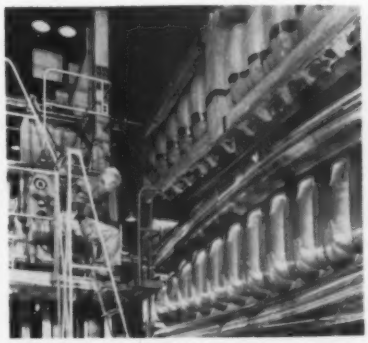
Martin Co., Baltimore, manufacturers of the plane on which the forging is to be used, maintains that it will be the world's first multi-jet seaplane.

Use of a 50,000-ton Air Force press made the project possible. Replacing several smaller components with a single piece affords important weight reduction and lowered costs through elimination of joining operations.

CANOE-like piece is reputed to be world's largest closed die forging, produced on a 50,000 ton press at Alcoa's Cleveland Works.

Dies Two Parts

A 4200-lb blank of aluminum alloy X7079 is pressed into the 3000 lb forging. As it comes from the dies it measures 13 ft in length, 1 ft thick and 3 ft across at its widest point.



TAKES a record breaking set of dies to turn out the big forging. Set weighs a total of 60 tons and took 1500 man hours per die half.

Finished dies weigh 60 tons, after some 7½ tons of metal were machined from the rough forged armor-plate die blocks, and another 7½ tons were whittled away during the actual sinking operation, and in milling of key and toe clamp slots.

Because of their exceptional size the dies were made in two sections to minimize distortion.

Alcoa constructed plaster models, from Martin specifications. Electric impulses were transmitted by a tracer arm to machines cutting tool. Engineering and construction of the dies required several months, with actual sinking and finishing taking 1500 man hours.

FOREMEN: There's Room For Improvement

Survey in 35 plants indicates union stewards have more general ability than foremen . . . Surveying consultants give probable reasons why . . . Suggest possible solutions—*By K. W. Bennett.*

◆ THERE'S BLOOD IN the eye of many a veteran foreman who's seen it, but a recent report by Patton Management Engineers, Inc., has a number of management men taking a long second look.

General ability of foremen in 35 industrial plants was tested and results compared with scores achieved by union stewards in the same plants, on the same ability tests. Patton found the union officials had the edge.

Patton Management Engineering concludes that too many men are being chosen for good quality or quantity on a production line—not for their leadership ability. One management consultant, commenting on the Patton report said, "I don't know how many plants we've gone into in which the management themselves didn't really know what they wanted a foreman to do, or even what qualities they expected a foreman candidate to possess."

Here's How

One recipe that's being inaugurated in several test plants with startling success:

(1) Pre-test your likeliest candidates and choose them on the basis of the test results.

(2) Test foreman currently on the job. Find out what scores your best foreman gets, then compare these with the scores of foremen in weak departments, as well as with the test scores obtained by candidates for foremen.

(3) Augment the tests with "pattern" interviews by a trained industrial consultant.

(4) Draw up a list of the qualities needed in a good foreman, and check these with your consultant.

(5) List the qualities needed in a foreman, put them on blank ballots, and let the plant work force vote by the ballot box method as to what men they believe possess these qualities.

The last suggestion sounds a little like an attempt at turning the whole office over to the work force. Fact is, however, that at least one plant is currently using this system with phenomenal success, and has for several years.

Each plant is a unit unto itself, but if a general formula does exist for learning more about foremen and potential foremen, job placement specialists would probably agree the above five-rule plan is it.

Can the small plant afford job consultants? In one instance a total of 10 men were tested for about $500. A five-man survey ran to $200. The results can amortize the testing costs, if testing is correctly handled, rapidly. One electric motor plant upped output by 25 pct after calling in a consultant. A chemical plant that combined consultation with incentive pay jacked up output by 40 pct.

Politician, Salesmen

The foreman is now more than ever management's main point of contact with the plant labor force. His role as a goodwill salesman is increasing and has been since the enactment of the Talf-Hartley law.

The union steward achieved his position because he's a salesman. A union moves its best politicians to the fore. And if the Patton survey (35 companies, total of 200 foremen and union officers) is correct, perhaps management must consider the political aspects of the foreman's job more closely.

Paper tests can be one of the levers to jack up management at the foreman level.

What Makes A Good Foreman?

Here's what management specialists say are prerequisites for a good foreman:

- **He must know company structure and how management operates.**
- **He must think in terms of his work group.**
- **He must know and follow the chain of command.**
- **He must work to develop a productive team.**
- **He should have some practical knowledge of time study.**
- **He must be a good face-to-face communicator.**
- **He should be selected by some criteria other than his production record.**

EXPANSION IN INDUSTRY

Texas Aircraft Center

Temco Aircraft Corp., Dallas, plans a million-dollar engineering center for its Garland plant. The facility, now in the design stage, will provide sufficient space for a professional force of 900 engineers. Completion is set for early next spring. Architects drawings call for a one-story, L-shaped building, with an area in excess of 100,000 sq ft. It will include laboratories and a 7500 sq ft bay area for experimental work, structural testing and prototyping.

The new building will release additional space for production at the main plant in Dallas. The company expects to double its production in the near future.

USS Sintering Plants

Construction is underway on two multi-million-dollar sintering plants for U. S. Steel Corp. at Gary, Ind., and Saxonburg, Pa. Initial capacity of each plant will be in excess of 15,000 tons of iron ore sinter per day.

Each will contain three machines and plans call for adding a fourth in the future. The plants were designed in collaboration with, and under license by, the Lurgi Co. of Frankfurt, Germany.

Dravo Corp., Pittsburgh, is fabricating the sintering machines and coolers at its Neville Island plant. The Gary installation will process ore from U. S. Steel's Mesabi mines. The Saxonburg plant will process Venezuelan ore.

India Gets Loan

Tata Iron & Steel Co., Ltd., of India, was granted a $75 million loan by the World Bank.

The money will help raise the company's annual output to 1.5 million long tons of finished steel. The First National City Bank of New York, the Irving Trust Co. and the Manufacturers Trust Co. are participating in the loan.

Demand for steel in India, which already necessitates heavy imports, is expected to increase sharply. The supplies made available by the proposed expansion should be absorbed by the internal market.

Fuel Plant:

$38 million contract let by Navy for Oklahoma project.

The Navy awarded a contract to Callery Chemical Co. for construction of a $38 million high-energy fuel plant near Muskogee, Okla. Work will begin as soon as designs are completed.

Fuel produced in the plant will be used in missiles and aircraft. The southwest site was selected because of availability of economical power and gas, the abundance of good water and favorable transportation costs for raw materials.

Callery Chemical, located at Callery, Pa., is a subsidiary of Mine Safety Appliances Co. of Pittsburgh. It was formed in 1948 to develop and produce specialized chemicals, and since 1952 has been working on the naval fuel program.

John T. Ryan, Jr., president of MSA announced the project. He stated further, that the new fuel plant would be constructed on government owned land. Contract calls for payment without fee.

Expansion Briefs

AC Spark Plug Div. of General Motors has begun construction of a 225,000 sq ft plant in Oak Creek, Wisc., a suburb of Milwaukee.

Greenfield Tap & Die Corp. announces the purchase of the assets of Horton Chuck Div. of E. Horton & Son Co., Windsor Locks, Conn. The Horton division will continue work on development of large diameter chucks for the aircraft industry and automation equipment, expanding regular inventory.

Almco Div. of Queen Stove Works, Inc., announces completion of a barrel finishing research and development laboratory, believed to be the world's largest, at Albert Lea, Minn.

Morgan Engineering Co., Alliance, O., has received an order for three 500-ton pit side ladle cranes from a large Eastern steel producer. The cranes will operate in a new openhearth shop, servicing seven large openhearth furnaces.

Bijur Lubricating Corp., Rochelle Park, N. J., is building an extension to its plant at Bennington, Vt., that will increase the facility's manufacturing space 50 pct. The extension will house a battery of automatic screw machines, testing and quality control.

Union Carbide & Carbon Corp. is planning construction of a basic research laboratory, a customer service laboratory and an office building on a 280-acre site near Tarrytown, N. Y.

Carboloy Dept., General Electric Co., name changed to **Metallurgical Products Dept.**, reflects greater emphasis on specialty metals development. Headquarters remain in Detroit.

EXPANSION

WRITE-OFF: Texas Mill Revives Issue

J & L's proposal to build mill near Houston stirs controversy over tax write-off . . . Company would need tax aid to build mill from ground up . . . If special case is made, protests will follow—By *J. B. Delaney*.

◆ JONES & LAUGHLIN Steel Corp.'s proposal to build a million-ton integrated steel mill near Houston, Tex., is furrowing a lot of official brows in the nation's capital.

The question: whether to grant J. & L. fast-tax amortization on the $250 to $300 million project. The defense expansion goal for steel has been closed for months, and steel firms with sizeable expansion programs in the works have had no luck getting it reopened.

All For Oil Country

The proposed J. & L. mill has a lot to offer from a defense standpoint. It would be devoted exclusively to production of seamless pipe and tubing for the oil and gas fields of the Southwest. In view of the delicate Middle East struggle between Israel and the Arab nations, defense authorities want to be in position to expand domestic oil capacity should a blow-up cut off overseas supply sources.

Some behind-the-scenes maneuvering has been going on to convince Arthur S. Flemming, director of the Office of Defense Mobilization, to make a special case of the J. & L. project and grant a Certificate of Necessity. But even the most convincing arguments might bring howls of protest from other steel producers whose applications for fast-tax privileges have been turned down.

Before the decision on the J. & L. mill is finally determined, top Administration officials probably will become involved. Particularly Secretary of Treasury George Humphrey, who has vigorously opposed efforts to reopen defense expansion goal for steel.

May Reconsider

In fact, the situation could call for a reappraisal of the steel expansion program from a defense standpoint.

J. & L.'s confirmation of the project, following an announcement by Congressman Albert Thomas, Houston Democrat, emphasized that the company's board of directors has not yet given its stamp of approval. This was interpreted to mean that the final go-ahead might hinge on a fast-tax certificate.

It was pointed out that building a steel plant from the ground up, as J. & L. proposes, is prohibitive in cost. Without fast-tax relief, the company would take a long, hard look before giving the green light. U. S. Steel received a Certificate of Necessity when it built the Fairless Works, the only other ground-up mill to be undertaken since World War II

May Take Months

Congressman Thomas said a definite conclusion on the project might be reached in five or six months.

The J. & L. plant would be located in Harris County, near Houston. It would include a blast furnace, four openhearth furnaces, blooming mill, two seamless pipe mills, a stretch reducing mill, and the usual heat-treating, tempering and finishing facilities for seamless pipe.

The new plant would not affect pipe-making facilities at J. & L.'s Aliquippa, Pa., works. In fact, plans for expanding capacity at Aliquippa are going forward.

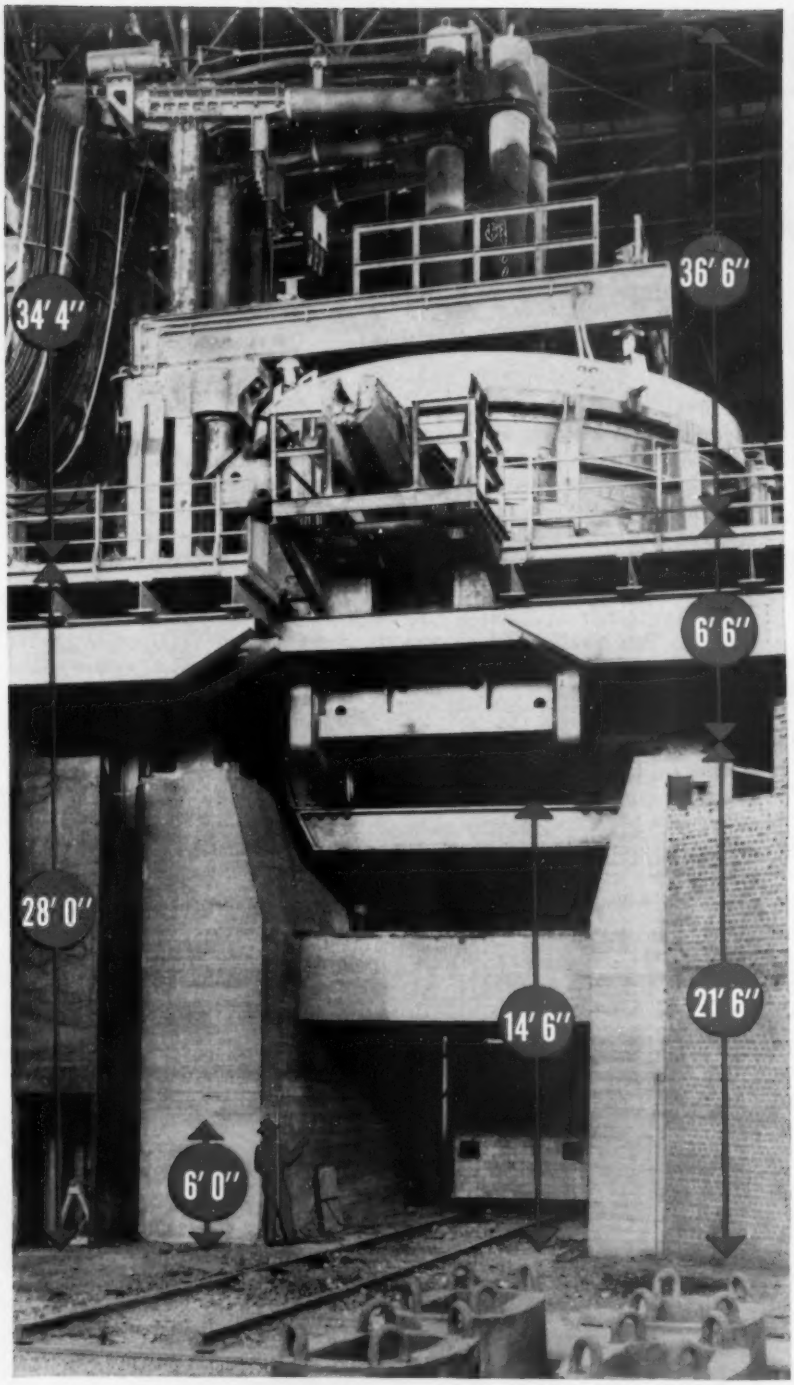
Does Fast Tax Cut Uncle Sam's "Take"?

▪ Opponents of fast-tax write-offs for defense expansion have argued that the program reduces tax revenues of the Federal Government.

▪ But studies by independent economists have raised doubts on this score.

▪ The studies indicate that while tax payments are reduced during the fast-tax period, Uncle Sam benefits in other directions through higher payments from those industries providing machinery and equipment to expanding companies.

▪ There's no way of estimating how much greater is the tax revenue from supplier industries through increased sales and from workers in those industries through higher and steadier pay checks. But the economic studies provide an interesting angle to recurring rhubarbs over the fast-tax program.



The most **POWERFUL** steel melting furnace operating in the world today is a **LECTROMELT***

6 others of even greater power are now under construction

For Catalog 9B describing these furnaces, write Lectromelt Furnace Company, 312 32nd Street, Pittsburgh 30, Pennsylvania (a McGraw Electric Company Division).

Compare the dimensions of this giant Lectromelt Furnace at Fabrique de Fer, Charleroi, Belgium, with those of the 6-foot man sketched alongside.

Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa . . . JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

RESEARCH

MAGNETS: Design Changes Are Coming

New manganese-bismuth material is expected to revolutionize magnet design . . . Perfected by Westinghouse metallurgists, it is now in commercial development stage . . . Made from powdered metals.

HIGHLY combustible manganese-bismuth powder bursts into flame.

◆ WESTINGHOUSE Electric Corp. metallurgists have perfected a magnetic material that has the advantages of extreme formability, is a non-conductor of electricity and is 10 times more resistant to demagnetization than present-day magnets.

The new substance is a compound of super-pure manganese-bismuth, explains Dr. Clarence Zener, acting director of Westinghouse Research laboratories. The process for isolating MnBi originated with Dr. A. J. Cornish, of the lab's magnetics and solid state physics department.

So promising are the properties of the new substance that it is expected to materially affect the future design, construction and performance of devices that now employ permanent magnets.

Powder Origin

Its high coercive force could result in a whole new assortment of magnets having novel shapes, particularly in the form of thin wafers or disks. Imperviousness to external magnetic fields would make them especially useful in electric meters, where stray magnetism from large electrical equipment is likely to be encountered.

Many of these unusual properties are attributed to the fact that the new magnets are made from powdered metals. Each individual MnBi particle is in itself a tiny magnet. The particles are insulated from one another by imbedding them in a plastic binder or matrix, which forms the body of the magnet and keeps the particles separated. Once magnetized, each particle adds to the total magnetism.

In contrast to the extremely hard, brittle steel magnets now in use, the new material can be easily drilled, tapped and cut. Further, it can be cast or molded—possibly even extruded—into any shape desired.

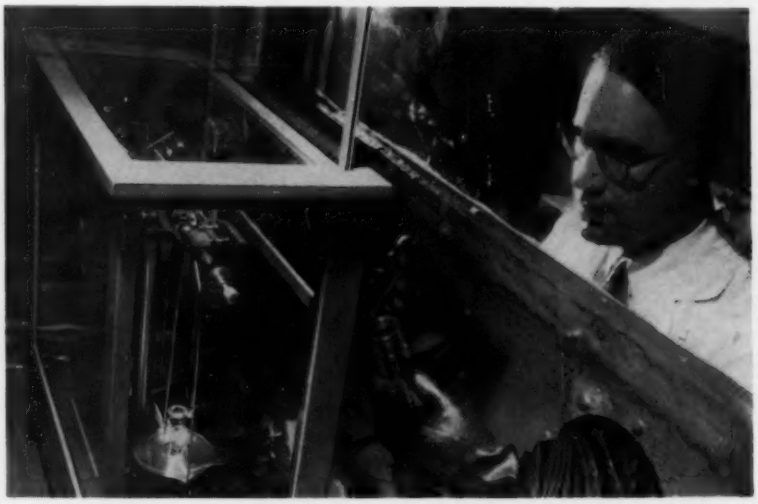
Now that the laboratory phase of super-pure manganese-bismuth is completed, Westinghouse has turned over the substance to its materials engineering department for commercial development.

Coke Plant Facelift

Three existing batteries of coke ovens at U. S. Steel's Clairton works are being dismantled for complete rebuilding as part of the firm's modernization of its 23 battery installation.

Contract for construction was awarded Wilputte Coke Oven Div. of Allied Chemical and Dye Corp.

They will build 192 new ovens measuring 37 ft long, 12 ft high and 19 in. wide. The batteries, of the gun-flue type, will have double collector mains for gas and coal chemical recovery. They will be equipped with self-sealing doors, are designed for smoke control.



A SAMPLE of super-pure manganese-bismuth is weighed by a Westinghouse scientist prior to forming into a magnet. Gas chamber device enables him to handle the material safely. When mixed with plastic, it is harmless.

Acme-Gridley

fully automatic turret lathe . . . gives you increased production in inverse ratio to cost

This customer chose a model MR Acme-Gridley to produce this packing gland nut, because he was able to increase his production by more than 3 times that of the former method.

The Acme-Gridley automatically controlled cycle is predetermined to give the minimum time per piece, on *every piece*. Because each tool-slide is independently cammed and selective spindle speeds are automatically controlled, machining can be done at the surface speed best suited for required finish and tolerance.

WRITE today for your free copy of new Bulletin MR-56. See why Acme-Gridley Basic Design lets you increase production and lower unit costs.

JOB FACTS

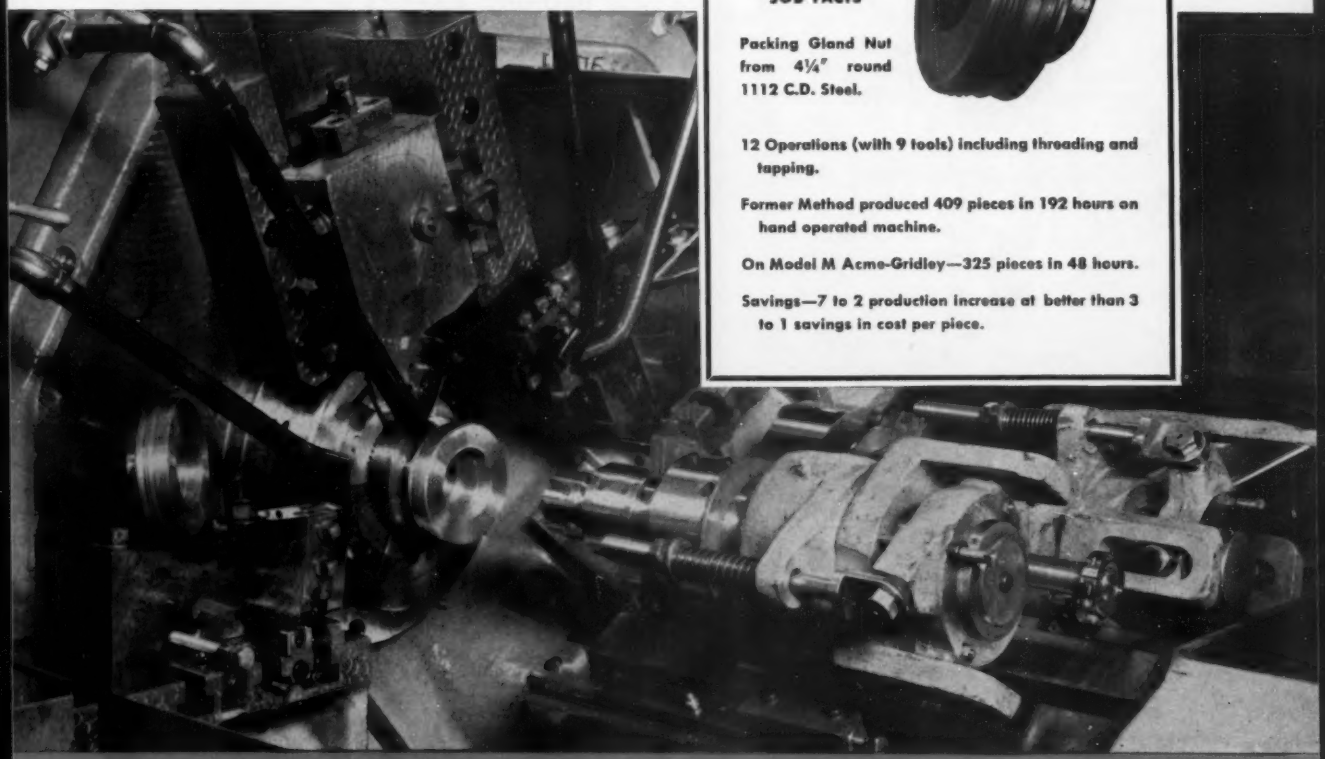
Packing Gland Nut from 4¼" round 1112 C.D. Steel.

12 Operations (with 9 tools) including threading and tapping.

Former Method produced 409 pieces in 192 hours on hand operated machine.

On Model M Acme-Gridley—325 pieces in 48 hours.

Savings—7 to 2 production increase at better than 3 to 1 savings in cost per piece.



National Acme

THE NATIONAL ACME COMPANY, 175 EAST 131ST STREET, CLEVELAND 8, OHIO

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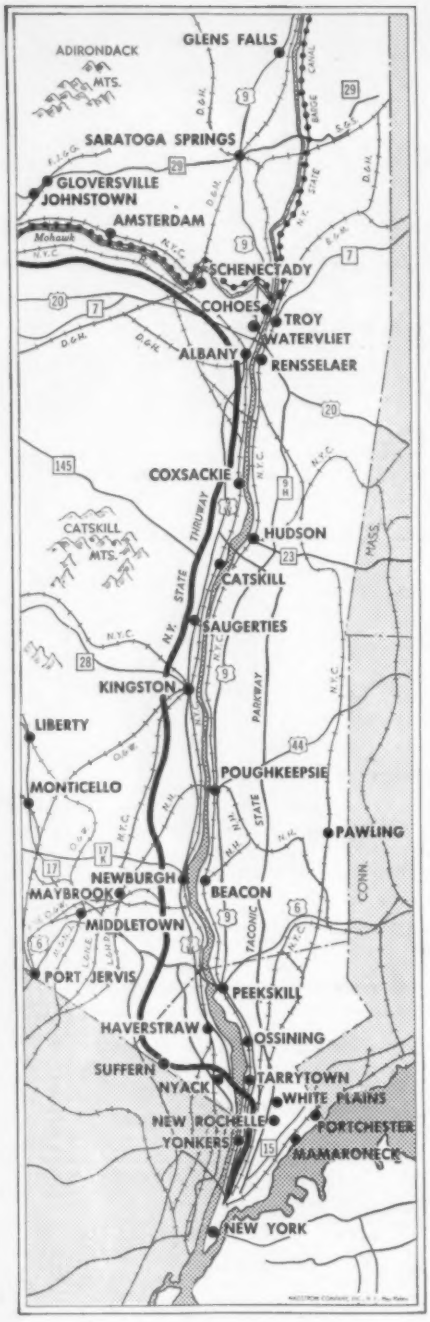


INDUSTRY REDISCOVERS New York State's HUDSON VALLEY

From the northern reaches of the Hudson, down to the great Port of New York, American industry is rediscovering the Hudson Valley.

Along the Hudson's banks—from north of Glens Falls to the Atlantic—new plants are building, lured to this historic valley by its rare combination of transportation, skilled labor and proximity to the greatest market in the world.

★ **MILLIONS OF DOLLARS** have been invested in new plants in the Kingston-Poughkeepsie area by the nation's largest business machine manufacturer.

★ **EXPANDING DEMAND** of unanticipated proportions encourages a leading producer of electric steels and alloys to expand almost continuously at Watervliet.

★ **FAST GROWING MARKETS** in New York, Connecticut and New Jersey and deep water transportation from Nova Scotia determine location of new plant by major national building products manufacturer near Haverstraw.

★ **CONCENTRATION OF ATOMIC RESEARCH** and development in Schenectady-Troy-Albany area—a new atomic research center coming at Pawling—the first privately financed power reactor to be built near Peekskill, all indicate that this is an area of creative engineering, of high educational standards, of intense interest in new ideas. Engineers and highly skilled men like to live here.

This is an area of unmatched transportation facilities. Close to the Metropolitan New York market, it offers: ocean transport as far as Albany; the Barge Canal north to the St. Lawrence and west to the Great Lakes; non-stop truck transport on the Thruway; rail and highways in profusion.

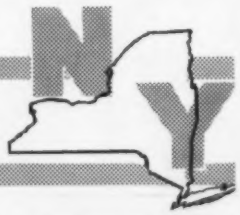
Complete data on site locations, as well as specific recommendations applying to your particular plant requirements, are yours for the asking. Why not write for this free service now!

Ready to serve you...

NEW YORK STATE'S INDUSTRIAL LOCATION SERVICE

For free copy of our booklet—"Industrial Location Services"—write Director, Industrial Location Service, New York State Department of Commerce, Room 528, 112 State St., Albany 7, N.Y.

SUCCESS BEGETS SUCCESS



NEW YORK STATE

Averell Harriman
Governor

Edward T. Dickinson
Commissioner of Commerce

REPORT TO MANAGEMENT

What Price Steel Expansion?

If you are a steel consumer, your attitude toward recurring price increases is understandably one of, "Why does it have to happen?" You probably feel, like some others, that you are the victim of a "squeeze" between steel companies and steel labor.

But that would be short-sighted. A deeper look at the issues might convince you that the outlook isn't all black as far as your company is concerned, that there will be long-range benefits not apparent on the surface. "It's an ill wind . . ."

It's pretty well accepted that steel needs a higher rate of return to stockholders to attract the risk capital necessary to finance expansion (in addition to the higher return per ton to pay for the substantial pay raises and other benefits gained by the steel workers).

But who will benefit from this expansion? Your company will, particularly in time of high steel demand which in the past has put some firms in the position of living hand-to-mouth and of paying through the nose for premium-price steel to keep the production lines rolling.

Why A Steel Shortage Is Costly

In a special analysis of small business' labor and supply problems, (Special Report, p. 27) Harold J. Ruttenberg points out that small business is particularly vulnerable in times of steel shortage; that small business is frequently unable to obtain the steel, as well as some other materials, just when the demand for its products is particularly strong.

In other words, production is frequently cut back when demand is strongest and profit should be highest. For this reason, an enlarged steel capacity is vital to much of industry. Helping to pay for it isn't all lost profit margin if it means availability of steel in times of peak product demand.

That's Not All

Some other factors of steel capacity are pointed out by Thomas Dimond, manager of commercial research, Youngstown Sheet and Tube Co., in a perceptive analysis in the Harvard Business Review.

The problem of maintaining a balanced steel inventory is a serious one to most steel users. It's pointed out that steel consumption actually varies much less than steel production. In other words, several points of steel production rates each year tend to result directly from inventory control.

Unless your company is more than usually astute in gaging the market, it has paid the price of inventory imbalance in periods of market fluctuation, actual shortage in times of extreme market tightness, and the cost of carrying overly large steel inventories at other times.

With substantial steel capacity assured, there would be less reason to gamble on building up excessively large steel stocks, or to liquidate them at other times. It would be profitable for most companies to be able to maintain their inventories on the strength of their own needs, not speculation about steel availability. It goes without saying that it is to the advantage of any steel user to have a long-term steel labor contract signed.

Aluminum Outlook Is Better

Among other basic metals, aluminum has shown an expansion-minded attitude. While aluminum has been in periodic short supply, expansion figures, past and planned, are reassuring.

The industry has grown over 40 pct in the past few years. Its capacity has increased from less than a million tons in 1950 to 1.6 million tons last year. By 1958 the rated capacity should reach nearly 2.5 million tons.

INDUSTRIAL BRIEFS

Cold Shoulder . . . A tube forming process to overcome usual difficulties of cold working uranium, titanium and zirconium metals and alloys has been developed by Tube Reducing Corp., Wallington, N.J. These metals normally tend to gall or seize when cold worked.

Air Power . . . Jack & Heintz, Inc., Cleveland, has developed a 160-kva generator, reported to be one of the highest rated machines of this type ever designed for aircraft. Project was undertaken at the request of the Bureau of Aeronautics.

Dig Those Hot Elements . . . Division of Raw Materials, U.S. Atomic Energy Commission has reorganized field activities so that Grand Junction, Colo., operations office will now direct all of the commission's uranium exploration activity west of the Mississippi River, in addition to continuing the ore and concentrate procurement program in the same area. Previously, this office's concern with exploration projects had been restricted to the Colorado Plateau area.

Modern Triumvirate . . . General Electric Co., is reorganizing its electronics business into three separate divisions; Industrial Electronics Div., headquarters at N.Y.; Electronic Components Div., headquarters Owensboro, Ky.; and Defense Electronics Div., headquarters Syracuse, N.Y.

Guided Backlog . . . McDonnell Aircraft Corp. received new guided missile business totaling $25.8 million during the month of May from both U.S. Air Force and Navy, bringing the company's current missile backlog to $36 million. McDonnell was selected prime contractor for one new missile and major subcontractor for another.

Some Thirst . . . Refrigeration equipment manufactured by Worthington Corp., Harrison, N. J., will be used to provide ice water for quenching baths at the Decatur Iron and Steel Co. plant, Decatur, Ill.

Elsewhere, Too . . . In Colorado: Work's underway on the $5.5 million Ramo-Wooldridge Corp., guided missiles plant which will employ 1350 people.

In British Columbia: British Ropes Canadian Factory, Ltd., wire rope makers; Lenkurt Electric Co. of Canada, Ltd., telephone and telegraph carrier equipment; and Fairey Aviation Co., Ltd., aircraft parts.

Summer Stock . . . Merger of Hydraulic Press Manufacturing Co., Mount Gilead, O., into Koehring Co., Milwaukee has been approved by the stockholders of both organizations. Plan calls for exchange of 1/5 share of new Koehring 5 pct cumulative convertible, $50 par voting preferred, and 1/6 share of Koehring $5 common for each share of HPM common.

"I think he's a space salesman!"

Und was noch alles? . . . AMF Atomics Inc., subsidiary of American Machine and Foundry Co., and the Federal Republic of Germany's State of Bavaria have signed contracts calling for the construction by AMF of a research reactor at Munich's Technische Hoshschule, for the training of atomic scientists. This will be the first reactor to be installed at a free Europe university.

For Sea Going Gushers . . . New York Shipbuilding Corp., Camden, N. J., department of Merritt-Chapman and Scott Corp., N. Y., and Dresser Industries, Inc., Dallas, manufacturer of oil, gas and chemical equipment, will construct and completely equip two ships to be used in offshore oil drilling by Coastal-Marine Drilling & Construction Corp., Houston, Tex. Initial contracts total more than $3.5 million.

Canadian Capers . . . Calumet & Hecla of Canada, Ltd., has been formed by Calumet & Hecla, Inc. as a wholly owned subsidiary. New firm will feature a new seamless, nonferrous tube mill at London, Ontario, built at a cost of about $7.25 million.

Branching Out . . . Frank B. Stallings, Cleveland has acquired the machine tool and pedestal grinder product lines of the Bradford Machine Tool Co., Cincinnati. Mr. Stallings also has purchased part of the manufacturing facilities, which he will move to Lansing, Mich., to continue to turn out engine and toolroom lathes and pedestal grinders under the Bradford label.

Airborne Sparky . . . AC Spark Plug Div. of General Motors will supply the U.S. Air Force with $627,555 and the Navy $596,783 worth of aircraft spark plugs.

BLAW-KNOX makes what it takes

for continuous, mechanical chipping

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

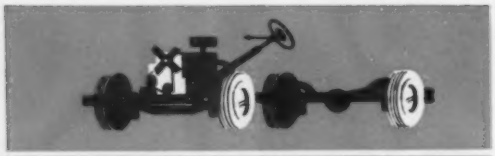
Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

50th Anniversary BLAW-KNOX 1906-1956

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



AUTOMOTIVE ASSEMBLY LINE

Ford Scores In Legislative Hassle

Company points out failings of O'Mahoney and Monroney bills at dealer meeting . . . Some dealers backtracking, asking others to drop support of measures . . . Congressional action in doubt—By *T. L. Carry.*

◆ FORD MOTOR CO. has started a counter move aimed at stifling the auto dealer legislation currently being considered by Congress. Objects in point are the O'Mahoney bill, which has already passed the Senate and is awaiting consideration in the House, and the Monroney bill.

Among other things, the bills would enable dealers to sue manufacturers for what is considered unfair treatment or for forcing dealers to take cars they do not want and for other alleged abuses in the industry.

Ford, along with practically every other automaker in the country, is opposing the bills almost as vigorously as some dealers are supporting them.

Bomb Dropped . . . Ford claims that if the bills become law, they will have the effect of raising prices and will lead to unemployment in the industry.

But perhaps the biggest bombshell Ford has dropped in the fight came at a recent meeting of the company with some of its dealers.

Ford did not threaten the dealers but candidly pointed out some of the possible results if the bills become law.

The company told the dealers that it will take whatever steps necessary to maintain its high volume of production.

Among the possibilities would be contracts for only one year's duration with the rights and obligations of both parties spelled out.

Factory Sales Angles . . . In addition, the company says that if it has to buy cars back from its dealers, its only alternative would be to sell cars in direct competition with its dealer organization.

The company also points out that if they are required to compensate dealers for maintaining warranty and service facilities without the dealer being obligated to the company, the only alternative would be establishment of factory service branches, at least in large metropolitan areas.

About Face . . . A change in the pricing policy and discount structure on parts and services would also be necessary if the bills are passed. Such changes would result in a cut in the margin of dealer profit.

As a result, a number of Ford dealers are now actively opposing passage of the bills and are urging other dealers to join the parade. It will be interesting to see just how the situation develops as the time for Congress to adjourn draws closer.

MAN with time in his hands is Frank Ball, supervisor, Oldsmobile electrical laboratories. The 16 auto clocks have spent three days in the deep freeze as part of the 30 day endurance test which each timepiece must pass.

Stainless Use Grows

While aluminum and other metals are being used in increasing quantities on today's automobiles, the amount of stainless steel for parts and body trim also continues to increase.

Builders of prestige cars are using more stainless than other automakers and for very good reasons.

Stainless steel is relatively cheap. it has a bright appearance and is practical.

Auto engineers like stainless because it is strong and can with-

How Great Lakes Steel *molds* quality

As molten pig iron gushes from the world's largest blast furnace, a generous cupful is ladled out into small, trough-like molds.

Cooled and solidified, these "guinea pigs" (samples of the iron that goes into open-hearth steelmaking) are then rushed to Great Lakes quality control laboratories. For they hold a big chunk of the secret to producing steel that meets customer specifications *all down the line!*

They tell if the blast furnace burden is precisely balanced. They tell if as many impurities as possible have been eliminated. They help tell just what "seasoning" must be added to the open hearth charge, so every batch of steel has the desired chemical composition and drawing qualities—and no buts about it!

Quality control *every* step of the way! That's our job at Great Lakes Steel . . . that, and the kind of service you expect—*and get*—from just one phone call.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Mich. • A Unit of

NATIONAL STEEL CORPORATION

LARGEST IN THE WORLD and first with a hearth diameter of over 30 feet, the No. 1 Blast Furnace is one of four at Great Lakes. Thanks to constant control, these furnaces produce iron that, beyond question, spells higher quality steel.

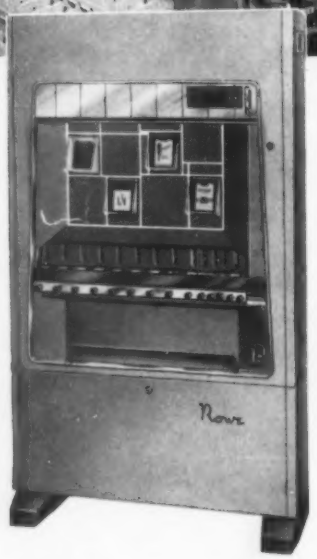
District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

PRODUCTION SHORT CUTS WITH

ZINC DIE CASTINGS

NUMBER 3 OF A SERIES

MAKING THE SALE FOR .... Rowe®



When you make a purchase from the familiar Rowe Ambassador cigarette machine, the coins are handled almost completely by a series of intricately shaped ZINC Die Castings. A die cast plunger then delivers the package you select. The efficiency with which this mechanical business transaction takes place is the result of expert engineering which has made Rowe "America's First Automatic Merchandising Family."

These are the outstanding production advantages provided by the use of ZINC Die Castings for the vital cigarette machine components:

1. Avoidance of expensive machining—the castings are virtually ready for assembly as received from the die caster.
2. Minimizing of assembly operations—unusual complexity of shape makes one part serve in place of several if produced by other means.
3. Assurance of trouble-free operation through sturdy construction and close dimensional control of all castings in long production runs.
4. Ability to take and hold economical and attractive plated coatings (external castings only, internal parts are used "as is").

The continuous use of ZINC Die Castings by Rowe Manufacturing Company, Inc. through many machine design improvements, over a long period of years, is a tribute to the fine performance of such parts under rough everyday operation. For possible answers to *your* production problems through the use of ZINC Die Castings, send for our brochure and contact any commercial die casting company.

Send for your copy

The New Jersey Zinc Company, 160 Front Street, New York 38, N. Y.

ZINC FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
JUNE 30, 1956*	115,347	22,685
JUNE 23, 1956*	116,534	24,649
JULY 2, 1955	166,742	28,138
JUNE 25, 1955	163,809	33,463

*Estimated. Source: *Ward's Reports*

stand bumps—is almost impervious to stone and gravel on the highway. It resists corrosion from chemicals used to clean ice from highways in winter.

Ford's Continental Mark II uses nothing but stainless steel for its trim. Altogether, 55 lb of the metal goes into every Continental produced.

It is used for such things as vent moldings, molding clips, rear view and side view mirrors, scuff plates, rocker panels and curb moldings.

The use of stainless on the Continental wheel discs is of particular interest.

The remark was recently made that wire wheels are not used on the Continental because they are too expensive. Actually, wire wheels are not used because they are impractical for tubeless tires. The discs that are put on the car cost more than the wire wheels.

The discs consist of 40 individually stamped stainless steel blades that are bolted separately to the rim. At one time, the Continental Div. experimented with a wheel disc that was stamped in one piece. But tests showed that this type of disc did not give the car the classic appearance which was desired.

The Cadillac Brougham, which goes into production next month, will use more stainless steel than any other car on the market.

It is unofficially estimated that over 70 lb of the metal will be used in various applications on the car. The largest amount will be accounted for in the stainless steel roof. In addition, lower half of the rear quarter panel, which extends for almost one-third of the car's length, will also be of stainless. Other applications will include the various pieces of body trim which traditionally have been stainless.

Automotive engineers are convinced that stainless steel is here to stay and that its use will become even broader in the future.

Jobs:

Army orders ease joblessness in automotive centers

Part of the financial ache created in automotive production centers by continuing labor layoffs is to be salved by new Army truck orders adding up to some $15.5 million.

Production of the medium and heavy trucks called for in the contracts is expected to begin immediately and to result in a decline in the number of idle auto workers. Latest statistics from the U. S. Labor Dept. show the net number of these unemployed persons as about 200,000 in June.

Michigan, with especially severe losses in automotive employment this year, is to handle about $13 million worth of the new orders. Total procurement in all areas under this program includes contracts for $8.2 million with General Motors, $3.7 million with Chrysler, $3.5 million with Willys, and $163,000 with International Harvester.

AUTOMOTIVE NEWS

All of the General Motors and Chrysler orders are to be filled in Michigan plants. Part of the production under the other two contracts will be outside the state.

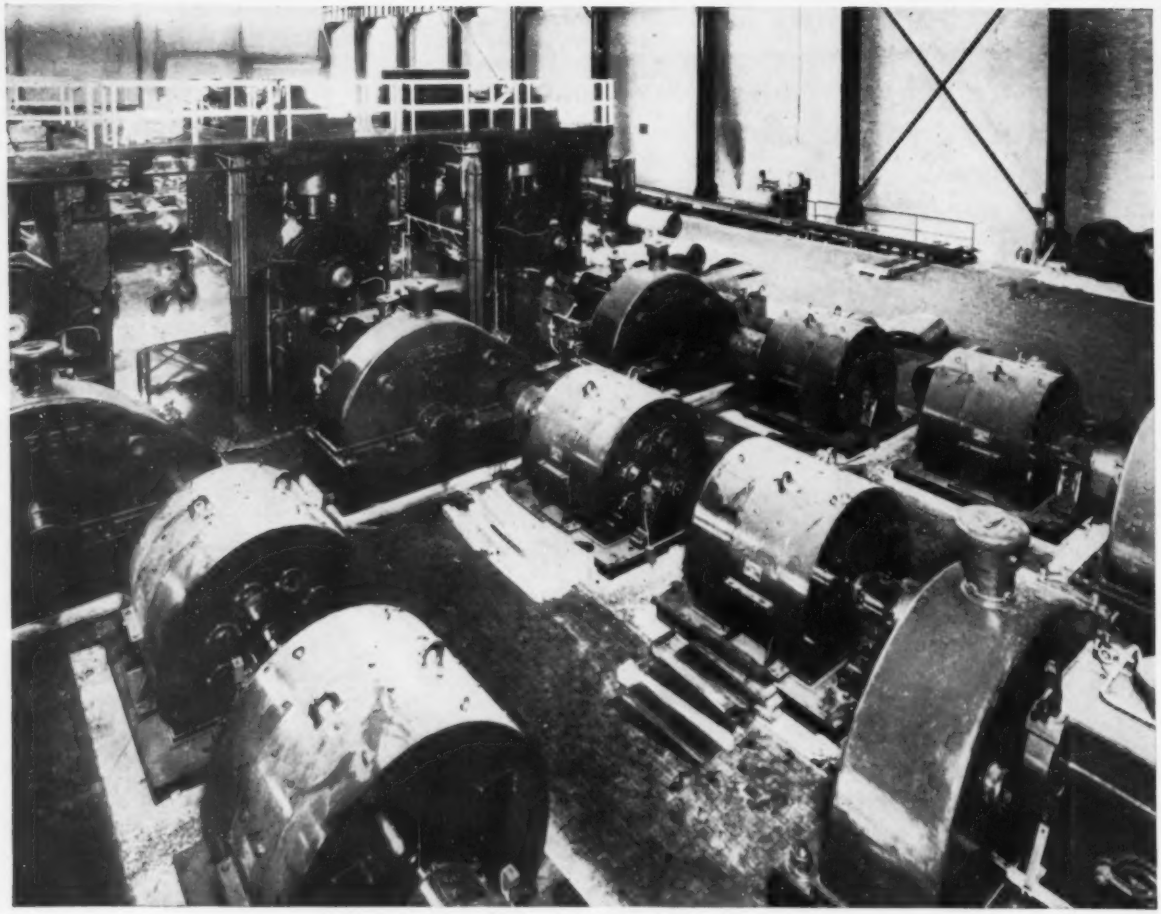
Indiana, which has reported between 15,000 and 30,000 jobless auto workers, will get some of the benefit of the Army program. The International Harvester output will be split between South Bend, Ind., and Detroit.

Not all the workers laid off as the auto factories cut their 1956 model production will return to work in the automotive field. Labor Dept. reveals that in California some 7,700 idled employees have turned to other jobs, principally in the aircraft industry.

Army action in signing the new truck contracts bears out a recent forecast by a White House official that speedy aid for the automotive business was planned. Howard Pyle, administrative assistant to President Eisenhower, based this prediction on the work of the Council of Economic Advisors.

THE BULL OF THE WOODS — By J. R. Williams

DON'T PILE THEM GREASY, OILY MESSES ON TH' PARTS I'VE JUST CLEANED! I WOULD HAVE A SLOPPY GUY LIKE YOU FOR A PARTNER!
WELL, I'M GLAD I GOT YOU-- YOU MAKE ME LOOK LIKE I'M WORKIN'! EVERY TIME YOU WIPE YOUR HANDS I MISS YOU-- IT TAKES AS LONG AS A COFFEE BREAK!
IT'S THE OLD FEUD OF TH' SLOPPY GUY AND TH' NEAT ONE--WHICH GITS TH' MOST AN' BEST WORK DONE! I THINK TH' SLOPPY ONE'S WIFE DOES TH' MOST WORK!
THE OIL BATHS
J.R.WILLIAMS
© 1956 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off. 6-4



How polar additives improve gear lubrication

TO be effective, a lubricant for enclosed reduction gears and bearings must cling to metal even under adverse conditions. That is why *Texaco Meropa Lubricant* is fortified with polar additives—to assure a tough lubricating film that *stays on* the metal under *all* conditions.

In addition, you'll find that *Texaco Meropa Lubricant* has outstanding extreme pressure properties—EP that withstands shocks and heavy duty steady loads far in excess of manufacturers' requirements, and outlasts other lubricants.

Texaco Meropa Lubricant resists thickening; will not foam, will not separate, will not corrode gear or bearing metal.

Texaco Lubrication Engineering Service will gladly help you get the most efficient operation from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

Businessmen Placed In Villain's Role

Public neither likes nor trusts businessmen, according to recent survey . . . Problem of misunderstanding, says one executive . . . Honesty and aggressive presentation considered key—*By G. H. Baker.*

◆ WHAT'S WRONG and where? Recent surveys show that many citizens quite frankly dislike businessmen. Suspicion, doubts, and mistrust are commonplace, unfortunately.

Why? Industry spends literally millions of dollars each year on frank, honest public relations programs to tell the public its story. Management leans over backward today to provide workers with good pay, good working conditions, hospitalization, family medical care, and paid vacations. These are facts which only serve to deepen the mystery.

What's The Story . . . John T. McCarthy, of General Electric's plant-community relations staff, admits sadly, in Washington, that too many workers neither respect or like businessmen. He says it is basically a problem of misunderstanding. Businessmen have got to try even harder to show people that management acts in the public interest, and that it truly has the welfare of communities at heart.

To whom should this story be told? McCarthy urges businessmen to tell it—truthfully and convincingly—to the workers, their families and friends, union leaders, school teachers, and to government officials.

Reverse Trend Or . . . Another top executive — M. J. Rathbone, president, Standard Oil of New Jersey—predicts that the public's fear of the motives of businessmen is going to result in the shackling of business by government if something isn't done to reverse the trend in the immediate future.

Industry once had the public's complete confidence. How do we get it back? Rathbone cites several pieces of anti-business legislation now pending in Congress (example: Anti-Merger Bill), and points out that only a handful of Congressmen are speaking against it.

Anti-business sentiment is no longer confined to either of the two major political parties. It cuts straight across both parties.

Go And Tell . . . Tell the public frankly what makes business tick, Rathbone advises. The future of our industrial economy is at stake, he declares, and it's up to management to be completely honest and forthright in getting its story across to the public.

"As a business executive, you know it took both brains and guts to get where you are. Keep using both. Be honest, be aggressive. Don't let the government take over by default."

Road Write-Offs

Some thought is being given at the White House level to granting fast tax amortization for road construction equipment. When the big new interstate highway construction program gets rolling next year, there will be a big jump in demand for earthmoving machinery and grading equipment of all types. There's no fast write-off plan for construction machinery now in effect, and there may not be, but the idea of fast write-offs as an incentive is at least being discussed.

"A" Power at Issue

Development of the atom for non-military purposes should be pushed by the federal government, not by industry, Atomic Energy Commissioner Thomas E. Murray tells Congress.

Mr. Murray wants Congress to order a vigorous new program of government exploitation of the atom. Private industry has already

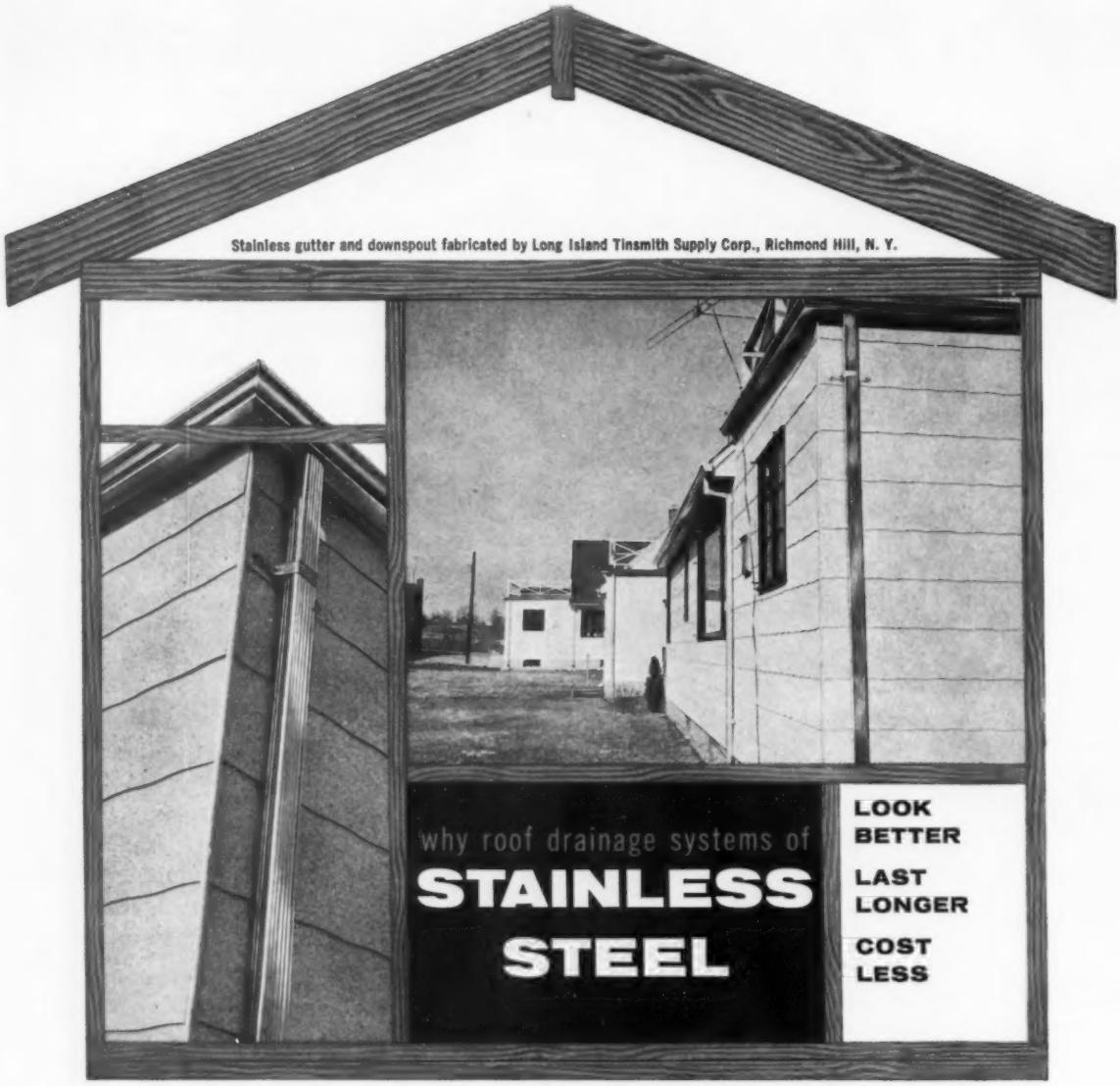
---

Changes Hats in Midstream

▪ Top business forecaster for the Truman Administration now says business and industrial activity this year is the greatest ever.

▪ Leon Keyserling, who kept former President Truman advised on the course of business, earlier had charged that President Eisenhower's policies were driving the nation into a depression.

▪ Keyserling now says there are still three trouble areas—automobiles, residential construction, and farm prices—but calculates that the "amazing pace" of government spending will more than offset these soft spots. Expects final industrial score for 1956 to be a record high.


Stainless gutter and downspout fabricated by Long Island Tinsmith Supply Corp., Richmond Hill, N. Y.
why roof drainage systems of
STAINLESS STEEL
LOOK BETTER
LAST LONGER
COST LESS

Stainless beauty is *lifetime* beauty—it won't rust, chip, discolor or stain walls as many other metals do. • And stainless is *strong*. It doesn't sag or bend under heavy deposits of ice and snow. And its exceptional wear and corrosion resistance means it stays on the job in spite of years of abrasion from gravel and debris, or the corrosive action of dead leaves. • These are reasons stainless is preferred by home buyers. It's first choice with fabricators, too, because it solders easily—is clean and simple to handle. • What's more, all these advantages come at a price which is competitive with ordinary materials—actually lower than some metals in common use. Call or write now for more details. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

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Canadian Distributor—Railway & Power Engineering Corp., Ltd.

gone far enough—and has failed—in developing atomic power possibilities, he says. He claims the present outlook for civilian atomic power is "very gloomy" because industry offers only half-hearted, inadequate ideas for exploiting the peaceful potentialities of the atom.

It's doubtful that this year's session of Congress will write Commissioner Murray's proposals into law. A majority of Congress is of the opinion that the present system of encouraging industry to develop the atom ought to be given a full and fair trial.

Mesta Buys Foundry

Mesta Machine Co. and General Services Administration are signing final documents under which the government will sell its Newcastle, Pa., Foundry.

Mesta, high bidder on the third go-around, will pay $8 million for the facility over a 20-year period. A $500,000 downpayment has already been made.

The foundry, which at one time represented about 40 pct of the nation's heavy casting capacity, has been idle for over a year. It was operated under a lease by United Engineering & Foundry Co. since it was built during World War II, but the lease was terminated about a year ago. At first, GSA appeared ready to sell it to United, but after a series of delays for various reasons, Mesta raised the bid.

The Justice Department and Congress have approved the sale.

POWER:

Congress may crack down on TVA

The days of free-wheeling expansion of the Tennessee Valley Authority may be drawing to a close. Congress talks of serving notice on the TVA to submit all major expansion plans to Washington for approval.

Result could be a gradual shift in the pattern of electric power generation and distribution in the Tennessee Valley.

Cries from the left wing over the possible "wrecking" of the TVA are not considered justified. Congressional leaders are making it clear that TVA bosses still may use some of their power revenues to build steam generating plants.

But there is an uneasy suspicion in the minds of many Congressmen that TVA has boldly taken expansion matters into its own hands, and that government advocates of government-owned power are thumbing their noses at the Congressional restraints on federally-owned utilities.

Likely outcome: TVA legislation, which will make it clear that TVA receipts from power customers must be turned over to the Federal Treasury, and that all major expansion programs must first be approved in Washington.

Appliance Price Move

Government experts who keep tabs on prices say the tags on household appliances are going to be marked up in the weeks immediately ahead. Refrigerators, air conditioners, stoves and the like have been selling at depressed prices all through the Spring. Discounts have been commonplace.

WASHINGTON NEWS

The coming firm-up in prices will not only hit appliances, but also furniture, house furnishing, and food, the experts say.

The government's cost-of-living index now stands at 115.4 pct of 1947-49 prices.

Spot Check Contractors

The government is going to look over the shoulders of defense contractors in 25 major cities.

Spot checks will be made, without notice, during the next 12 months by representatives of President Eisenhower's Committee on Government Contracts. The committee's stated purpose is to expand job opportunities for Negroes.

Investigations will be made in Washington, Atlanta, Baltimore, Birmingham, Cleveland, Chicago, Cincinnati, Dallas, Detroit, Houston, Indianapolis, Jacksonville, Kansas City, Los Angeles, Louisville, Memphis, Nashville, New Orleans, New York City-Northeastern New Jersey, Norfolk-Portsmouth, Philadelphia, Pittsburgh, Richmond, St. Louis, and San Francisco-Oakland.

Our Fault, Says Internal Revenue

▪ Do you breeze through paperwork on your job, filling out complicated forms accurately and completely, only to stumble over the questions asked by the government on your income tax form?

▪ If so, you're typical.

▪ Treasury has just released results of a study made of 1954 tax returns. Only taxpayers using the long form (Form 1040) were included. Here's what the T-men found:

▪ 44 million taxpayers filed Form 1040

▪ 1.3 million failed to list themselves as exemptions

▪ 14.9 million left blank name of his or her spouse

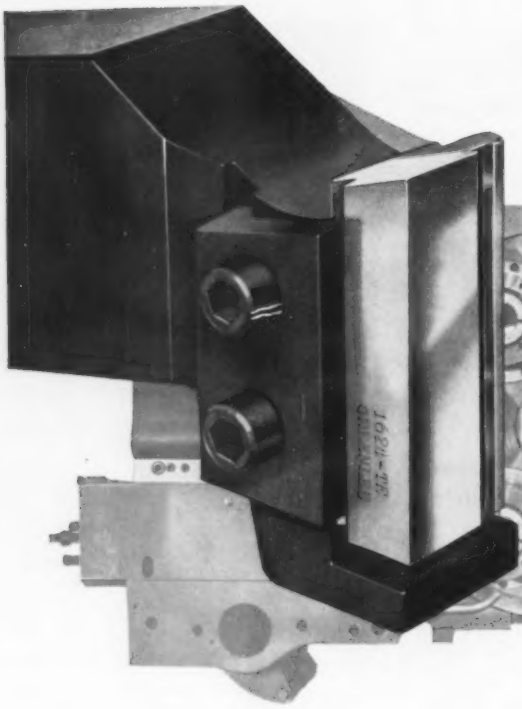
▪ 31 million did not fill in amount of the tax due

▪ 15.8 million figured the amount of refund due and then left it out

▪ 6.6 pct did not list Social Security numbers

▪ 7.5 pct blanked the line "occupation."

▪ Revenue people figure that it's probably their fault. They promise to come up with a whole rash of new, easy-to-answer questions in forms, which will hit your mailbox in January.



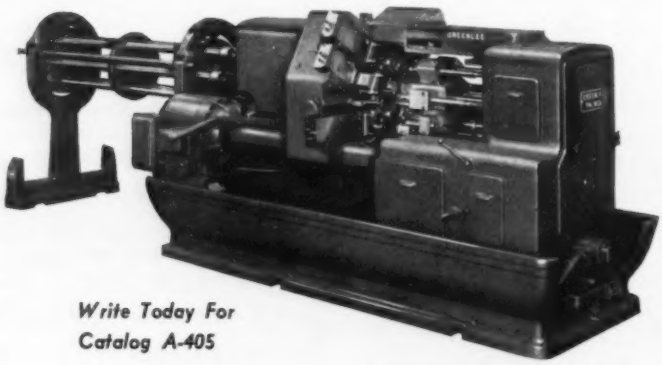
PRODUCTION MACHINERY

GREENLEE

INTER-CHANGEABLE TOOL HOLDERS FIT ALL CROSS-SLIDES ON GREENLEE BAR AUTOMATICS

They Save You Set-Up Time . . . Reduce Tooling Costs

Tool holders can be quickly and easily changed from one position to another . . . from one Greenlee machine to another (within their size range). All cross-slide cavities are identical . . . tool holders fit these cavities exactly. Greenlee Interchangeable Tooling is more *flexible* . . . more *efficient* . . . more *economical.* On short runs especially, the savings on setup time is considerable. Greenlee engineers will be glad to show you how to attain maximum production with a minimum number of tools and holders. Take advantage of this valuable service now.



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PRODUCTION MACHINERY

GREENLEE

GREENLEE BROS. & CO.
1807 Mason Avenue
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Canner Believes Future In The Bag

R. G. Lucks says more companies are headed west . . . Result is more diversified activity and better industrial balance . . . Canning extends eastward to shorten supply lines—By *R. R. Kay.*

◆ YOU CAN'T make love long distance—and still deliver the goods as effectively as the man on the scene.

An increasing number of eastern corporations are realizing this. Result: more of them are moving westward to serve the fastest growing region in the U. S.

Similarly, home office control is gradually shifting west as this expanding area demands proximate attention. It's amazing how contagious this manufacturing shift becomes. One large corporation makes the move and other businesses start pencil sharpening, and flight to the West picks up momentum.

Just the Start . . . That's what's happening now; Roy G. Lucks, president of California Packing Corp., told the Pacific Coast Shippers Advisory Board. Mr. Lucks, who heads one of the fastest-growing companies in the canning industry, believes, "This is only the beginning. The industrial migration so far is just the advance guard."

That's why he's shouting, in a voice he hopes will be heard across the country, that the outlook for the West is bright and full of promise.

Mr. Lucks maintains that the West has changed from heavy dependence on raw materials "to a balanced program of both resources and market development." He points out what some consider the strange picture of western heavy industry producing for the markets of the East, "is becoming ever more common."

Eastward Also . . . This California canner, whose firm has 42 plants in 12 states, knows at first hand the advantages of producing in your market for your market. And western canners, who pack three-quarters of the canned fruits and one-third of the vegetables used in the U. S., "enthusiastically anticipate a shortening of the supply line connecting warehouses with the buyer-consumer," the Calpak chief reports.

This hint of extending canning operations eastward would overcome high transportation costs of the long hauls, typical in western territory.

Diversification . . . The western economy, Mr. Lucks emphasizes, is no longer just a mixture of fruits, vegetables, and movie actresses. "The diversified patterns introduced by aircraft plants, oil refineries, chemicals, auto assembly, atomic power development, electronics, the construction industry, and many others preclude the cyclical dangers of specialization."

Other bright spots in the western economy: aluminum industry; power developments in the Northwest; mining in the intermountain states; and the aircraft and construction industries in California.

Freight Up . . . Third quarter outlook for various western industries as gaged by predicted carloading requirements: Shipments of ore and concentrates, hit by strikes in same period 1955, will skyrocket 82 pct. Movements of other metals will climb 52 pct.

The overall freight car requirements for the third quarter will be up 7 pct from actual loadings same period last year.

Jet Propelled "Greenhouses"

◆ PEOPLE in glass houses have a lot more to worry about than just stones—especially when the people are jet pilots and the "glass" houses are the only thing between them and the rarified air rushing by at close to the speed of sound.

For this reason the Torrance location of Douglas Aircraft's El Segundo, Calif., div. constructed a special building, pressurized throughout to remove contaminating dust, for production of plastics.

Over 300 production employees turn out approximately 4000 parts per week, among which are the vital plastic canopies for the high flying jets.

COMMON SENSE says it's better...

Twin Screw Knee Support

Available under Tool-Lease program

Think it over... twin screw knee support is the one really new basic advancement in knee type milling machine design in years. And only Kearney & Trecker new TF Series machines have it!

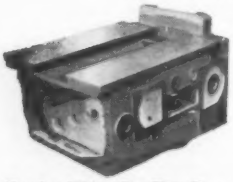
Here's why it makes sense.

Because the *twin screw* design distributes most effectively the weight of much larger, heavier knees, saddles and tables, it fulfills today's requirements for higher speeds, feeds and power — greater machine capacity. What's more, this *balanced design* substantially increases stability under heaviest loads... offers greater resistance to torsional thrust under all cuts... divides the wear factor in half, thus assuring greater, longer-lasting accuracy.

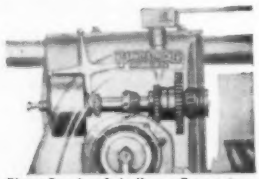
Kearney & Trecker's feature-packed TF Series line of general production machines is available in five sizes — No. 2 to No. 6, from 10hp to 50hp in Plain, Universal and Vertical styles.

Why take less than the latest when you want new milling machines? You can get all the facts on the new TF's from your Kearney & Trecker representative, or write direct to Kearney & Trecker Corp. Mail coupon for new catalog with details on TF Series machines.

5 more reasons why TF Series milling machines are way out front in rigidity

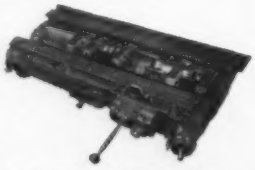


Heavier, Wider, One-Piece Knee — The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways is increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.



Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life, better finish and quieter operation.

Double "Vibra-Void" Overarms — Two solid steel bars, mounted completely through column, void vibration at source, afford more rigidity and resistance to deflection than any other type support. Design also greatly simplifies changing of arbors and cutters.



"Fron-Trol" Operating Convenience — Front-mounted controls include feed selection, Mono-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, table handwheel, saddle clamping gib and backlash eliminator. Machines have 2" dia. table feed screw.

Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine maintenance.

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Old Machine Tool Concepts Fade Away

London machine tool exhibit dispels idea that European pieces are far inferior to U.S.-made . . . British equipment bigger and more automatic than that at last show—*By E. J. Egan, Jr.*

◆ TRADITIONALLY, European-made machine tools are classified as lower powered, less rugged, less automatic than American models. But U. S. visitors to the current International Machine Tool Exhibition in London see this concept fading away.

It's been four years since the previous Exhibition at the huge Olympia site. That's ample for plotting any general pattern of progress by European builders, and there has been considerable.

Generally speaking, developments show up in the form of more:

1. automatic handling of workpieces,
2. electronic control of feeds and speeds,
3. rugged construction coupled with higher horsepower,
4. copying mechanisms, either built-in or as attachments,
5. machining accuracy and built-in gaging equipment.

U. S. builders are well represented at the Exhibition. Most are re-showing machines they introduced at the Machine Tool Show in Chicago last fall. But bulk of the floor space is taken up by the products of British machine tool firms.

Bigger . . . General upgrading in equipment size is typified by the gear-making machines of David Brown Industries, Ltd. In the past few years the firm has developed a series of large spiral bevel and hypoid gear machines which were formerly obtainable only from U. S. sources.

Trend toward greater use of copying devices is exemplified in a boring and turning mill made by Webster & Bennett, Ltd., equipped with an electronic profiling attachment. A copying lathe shown by Drummond Bros. is also controlled electronically.

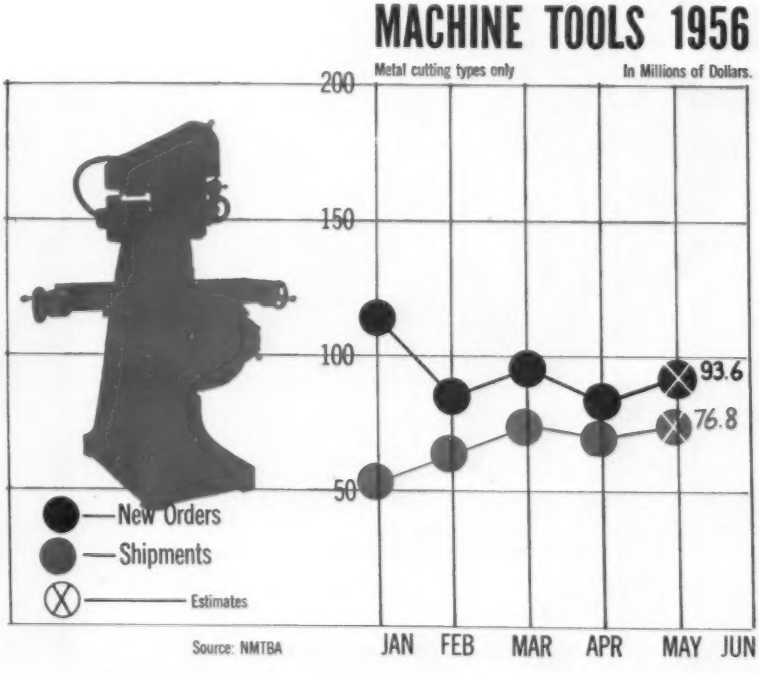
And Better . . . Among the small production milling machines exhibited by Central Tool & Equipment Co., Ltd., is one that works automatically to any sequence of movements in either the table or cutting head. Cycle is set by positioning buttons in slots. No cams are used for even the most complicated setups.

Punched card control or push buttons can be used to put Newall Engineering Co., Ltd.'s new jig borer through its paces. Machine features an open-sided design with its rapid precision setting and control system.

Orders Bloom in Spring

On their side of the Atlantic, U. S. builders of metal cutting machine tools racked up $93.6 million in gross orders during May.

May shipments, highest for the year to date, indicate the industry is doing better at catching up to the stack of unfilled orders it has on hand. Total shipments during May were about $23 million ahead of the rate attained in the same month last year.



HEAVY EXTRUDED SHAPE

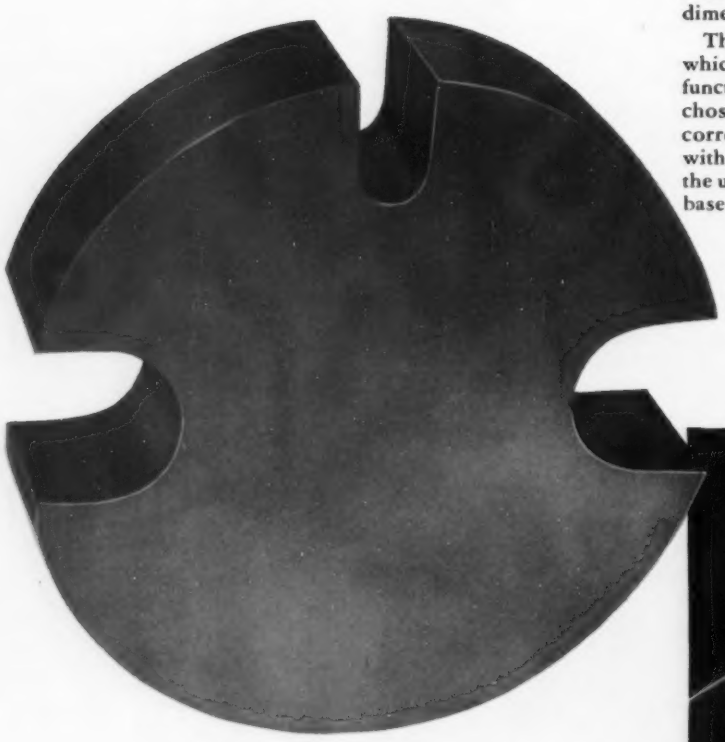
Saves Over 25¢ per lb.

FOR THE STRONG ELECTRIC CORP.

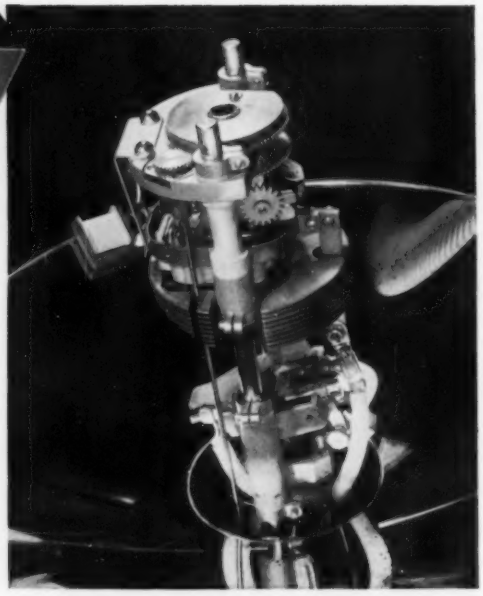
The unusual thing about this copper extruded shape is that it saves money in first cost as well as in machining time. The double economy amounts to over 25¢ per pound. The large illustration shows the shape as supplied in the form of a slug or pre-formed disc, 1 1/16" x 5". This begins as a long extrusion, from which Revere cuts the discs, and pickles them before shipping.

The customer is The Strong Electric Corp., Toledo 2, Ohio, which originally tried plate and bar, but found costs were too high. Revere Product Engineers, Methods and Production Departments collaborated with the company on the problem, and were able to develop the unusually heavy and economical shape. Strong reports a number of savings. One is that the shape is machined quickly and perfectly, with almost no rejects. This is due to the denseness and uniformity of the metal, a result of the high pressures exerted during extrusion. (Finishing operations include drilling bolt holes and cutting cooling fins.) As a secondary result of improved machining, the customer does not have to keep large inventories of metal to take care of spoilage, nor handle large quantities of scrap. Further, Revere supplies the discs in the correct thickness, eliminating a cutting-off operation for Strong. Incidentally, we are glad to supply shapes cut to dimensions, or in long lengths, as desired.

The completed part is an obturator-probe, which fulfills a control and heat dissipation function in a powerful searchlight. Copper was chosen for its ability to conduct heat and resist corrosion. Revere will be glad to collaborate with you in your search for economies through the use of extruded shapes in copper and copper-base alloys, and aluminum alloys.



Copper Extruded Shape, 1 1/16" x 5", as furnished.



Shape in place in a carbon arc searchlight mechanism.

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The Iron Age SALUTES

James D. Maitland Chairman of the board of Colorado Builders Supply Co., his civic and industrial accomplishments have won admirers from coast to coast. The ability to make and keep friends is his outstanding trait.

If the quality of friendship were measured in gold, the steel industry would have a 24-carat pal in James D. Maitland. Wherever a metalworking plant is located, probability is that someone in the organization has met Jim Maitland at one time or another. Mere mention of his name invariably will bring forth a warm smile and a recounting of at least one humorous story. For Jim Maitland's affinity for people, his genuinely magnetic personality and irrepressible sense of humor have drawn hundreds into his circle of friendship.

Born in Springfield, O., in 1883, he journeyed westward during his youth, picking up a degree in mechanical engineering at Nebraska State University on the way. Alighting at Denver, he went to work for the Colorado Builders Supply Co., and today is that firm's board chairman.

In the years between, his company and his community were beneficiaries of a tremendous vitality and keen mind. He was instrumental in reorganizing the Manufacturer's Assn. of Colorado, the formation of the Mountain States Employers Council; is active in the Army Ordnance Assn. and numerous trade and fraternal organizations. Especially is Jim Maitland revered by the police and firemen of Denver. On many occasions he has helped solve their departmental problems. In doing so, he has become acquainted with civil employees throughout the country.

When Mr. Maitland works, he is intense. But when he relaxes, he goes in for recreation in a big way. He owns a 320-acre "play" ranch where he keeps several Tennessee walking horses, three mules and other breeds of horses. Rarely is the ranch without guests. Somehow, he finds time to appreciate a fine record collection which ranges from humorous ditties to symphonies. But his prize possession is an electric organ equipped with a stop that plays barrelhouse rolls like the oldtime player pianos.

Ohio Rolls

shaping metal for all industry

Choose from 12 types of
Ohio Iron and Steel Rolls:

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Flintuff Rolls
Holl-O-Cast Rolls
Chilled Iron Rolls
Dense Iron Rolls
Nickel Grain Rolls
Special Iron Rolls
Nioloy Rolls
Ohio Double-Pour Rolls
Forged Steel Rolls

THE OHIO STEEL FOUNDRY CO.
LIMA, OHIO

Plants at Lima and Springfield, Ohio

The Iron Age INTRODUCES

Carl Beers, appointed sales representative in the Michigan area by **Carl Mayer Corp.,** Cleveland.

Clemens C. Sutinen, named technical sales engineer, powder metallurgy equipment division of **Simetag G.m.b.H.,** subsidiary of Mannesmann-Meer, Germany.

James A. Dunn, appointed manager, Trenton plant, American Bridge Div. of **U. S. Steel Corp.**

William T. Welch, elected chairman of the board. **Ajax Flexible Coupling Co.,** Westfield, N. Y.; **Wayne Belden,** president; **Harley E. Northrup,** executive vice president; **Charles W. Belden,** vice president; **Robert G. Cady,** treasurer; **Thomas H. Brumagin,** secretary.

J. Stewart Munro, named president, **Raybestos-Manhattan (Canada) Ltd; Douglas Pocock,** named vice president, replacement sales.

Thomas N. Willcox, appointed senior equipment engineer, **General Electric Co.'s** manufacturing services, Schenectady, N. Y.; **Theodore E. Poliakoff,** appointed senior coil manufacturing engineer; **Walter P. Sime, Jr.,** inspection engineer, quality control service.

W. R. Schreiner, appointed assistant treasurer Weirton Steel Co. Div. of **National Steel Corp.,** Weirton, W. Va.; **R. E. Lee,** appointed comptroller.

Fred J. Risberg, appointed assistant district sales manager, St. Louis office, **Granite City Steel Co.**

Lester R. Lindsley, appointed sales manager, P. W. Voss & Associates, Chicago representative, **Automatic Transportation Co.,** Chicago.

Edward Kunzman, appointed sales and service engineer, Frit Div., **Ferro Corp.,** Cleveland.

Vincent P. Bane, appointed manager of employee and community relations, **General Electric Co.'s** appliance motor department, DeKalb, Ill.

A. R. Civitate, appointed aircraft service director, **Vickers, Inc.,** Detroit.

David W. Thomas, named manager, and **Albert Lang,** assistant manager, **Solar Steel Corp.,** Chicago.

Kenneth F. Ebbeson, appointed abrasive engineer, metropolitan Boston area, by the **Norton Co.,** Worcester, Mass.

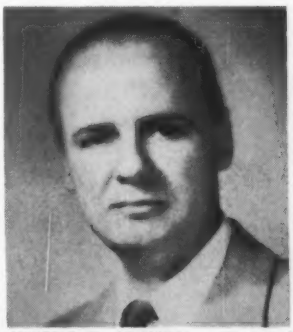
Leonard H. Clark, named assistant to vice president, sales, **Standard Pressed Steel Co.,** Jenkintown, Pa.

Frank M. Shy, appointed southern farm extension representative, **Republic Steel Corp.,** Cleveland, O. His office will be in Birmingham, Ala.

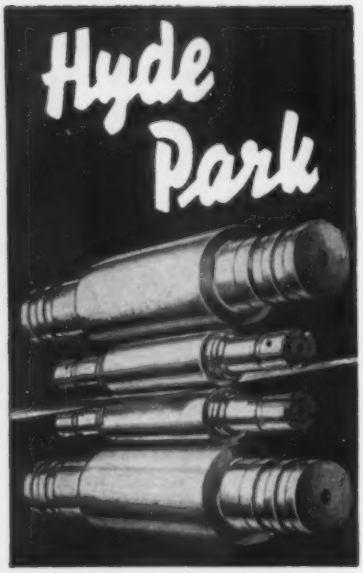
AUSTIN J. PADDOCK, elected president, American Bridge Div., U. S. Steel Corp., Pittsburgh.

NORMAN B. OBBARD, elected assistant executive vice president—operations, U. S. Steel Corp., Pittsburgh.

DUNCAN GARDINER, named director of research and development, Vickers Incorporated, Detroit.



JOSEPH P. CHAYKA, appointed chief engineer, Detroit Broach & Machine Co., Rochester, Mich.



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GREY IRON CASTINGS

John V. Banks, named production manager, **Kaiser Steel Corp.'s** Fabricating division, Montebello, Calif.

Herbert Heesch, appointed manager of chemical sales, **Hooker Electrochemical Co.,** Niagara Falls, N. Y.; **James E. Ferris,** appointed product manager of inorganic chemicals; **Stanley A. Mattison,** appointed product supervisor; **Matthew F. McCombs,** appointed product supervisor of potash chemicals; **Joseph E. Thornberg,** appointed market analyst; **Ferri Casciani,** appointed supervisor of technical service.

Philip E. Gordon, named manager, Los Angeles sales district, **Latrobe Steel Co.,** Latrobe, Pa.

Walter E. Billingham, named assistant superintendent, Indiana Harbor Coke plant, **Youngstown Sheet & Tube Co.,** East Chicago, Ind.

Daniel L. Weller, appointed technical sales and service representative, Pittsburgh district, **Electro Metallurgical Co.,** a division of **Union Carbide & Carbon Corp.**

Bernard Fuller, named Detroit district sales manager, **Hevi-Duty Electric Co.,** Milwaukee.

Dr. W. R. G. Baker, vice president, **General Electric Co.,** named consultant to C. W. LaPierre, executive vice president of GE's electronic, atomic and defense systems group.

George A. Smith, appointed production manager, materials handling division, **Yale & Towne Mfg. Co.,** Philadelphia.; **Michael F. Ryan,** named manufacturing assistant to the general manager.

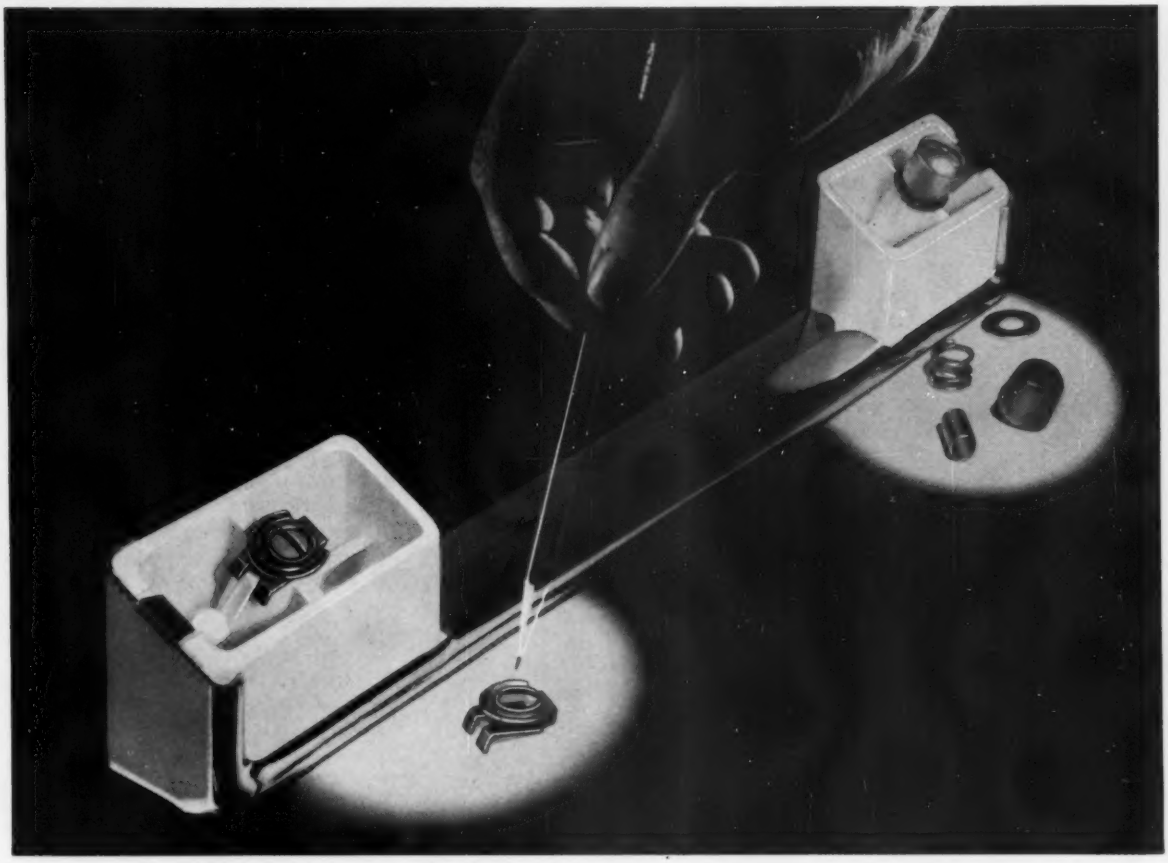
Edward N. Clark, named assistant to the factory manager, cutting tool and gage division, **Pratt & Whitney Co., Inc.,** West Hartford, Conn.; **Ralph Winspear,** appointed superintendent of cutting tool division.

J. J. HITE, appointed director of engineering, American Hoist & Derrick Co., St. Paul, Minn.

LLOYD R. COOPER, appointed chief metallurgical engineer, Heppenstall Co., Pittsburgh.

WILLIAM R. GEALEY, named superintendent of rolling department, Butler, Pa., works, Armco Steel Corp.

HAROLD A. KETCHUM, elected financial vice president, Federal Pacific Electric Co., Newark.



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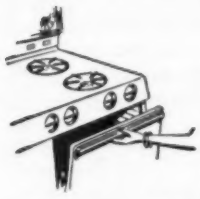
One-Piece SPEED CLIP® replaces 4-part fastener, helps assembly and shipping... and saves money!



Four separate parts plus screw were required to fasten each end of the removable door handles on kitchen ranges manufactured by the Caloric Appliance Corporation, Topton, Pennsylvania.

Tinnerman fastening specialists teamed up with Caloric designers to eliminate 3 of the parts!

Now . . . a special one-piece, multi-purpose SPEED CLIP plus screw do the same job more efficiently and at lower cost, and reduce small parts handling. Faster, easier assembly . . . fewer parts to buy, inventory and handle. Packed inside the oven for safe shipment with SPEED CLIPS in place, the door handles are dealer-applied in far less time, can be easily removed by the housewife for cleaning.

The resiliency of the spring steel SPEED CLIP prevents crazing or chipping, enables it to absorb varying panel thicknesses and porcelain enamel build-up. Changeover was made without retooling or redesigning door handle or keyhole-shape mounting holes.

Find out now where SPEED NUT brand fasteners belong on your assembly line. There are more than 8000 variations to choose from. Call your Tinnerman representative for complete details and write for our Fastening Analysis Bulletin No. 336.

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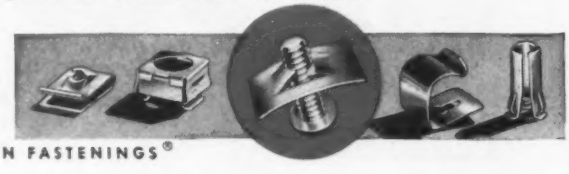
Speed Nuts®

FASTEST THING IN FASTENINGS®



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Indiana

B. F. Maddux, appointed assistant general traffic manager, **Kaiser Steel Corp.,** Oakland, Calif.

John P. Spain, named service sales manager, **The Black & Decker Mfg. Co.,** Towson, Md.

J. H. Elliott, elected executive vice president, operations, **U. S. Steel Corp.,** Pittsburgh; **E. H. Gott,** elected vice president, operations-steel; **E. B. Speer,** named general superintendent, Fairless Works; **Albert J. Berdis,** named general superintendent, South Works, Chicago; **K. L. Johannsen,** named ass't general superintendent, Fairless Works.

Richard Reising, named production planner, Fabricating Div., **Plume & Atwood Mfg. Co.,** Thomaston, Conn.

Earl W. Haefner, elected assistant to president, **Borg-Warner International Corp.,** Chicago.

George I. Seybold, elected vice president, **The Rust Engineering Co.,** Pittsburgh.

Richard M. Parrish, named Los Angeles district sales manager, **SKF Industries, Inc.,** Philadelphia; **W. Henry Keire,** named field engineer, Los Angeles.

Franklin S. Atwater, named general works manager, **The Farnir Bearing Co.,** New Britain, Conn.; **Thomas J. Leonard,** appointed general production manager.

C. G. Tournay, named ass't to president, **Weirton Steel Co.,** Div. of National Steel Corp., Pittsburgh; **F. T. Bowen,** elected treasurer and ass't secretary; **W. S. Schwoebel,** named comptroller and ass't treasurer; **W. E. Prosser,** named secretary. **H. A. Lidtke,** appointed ass't comptroller; **P. A. Duerksen,** appointed ass't treasurer.

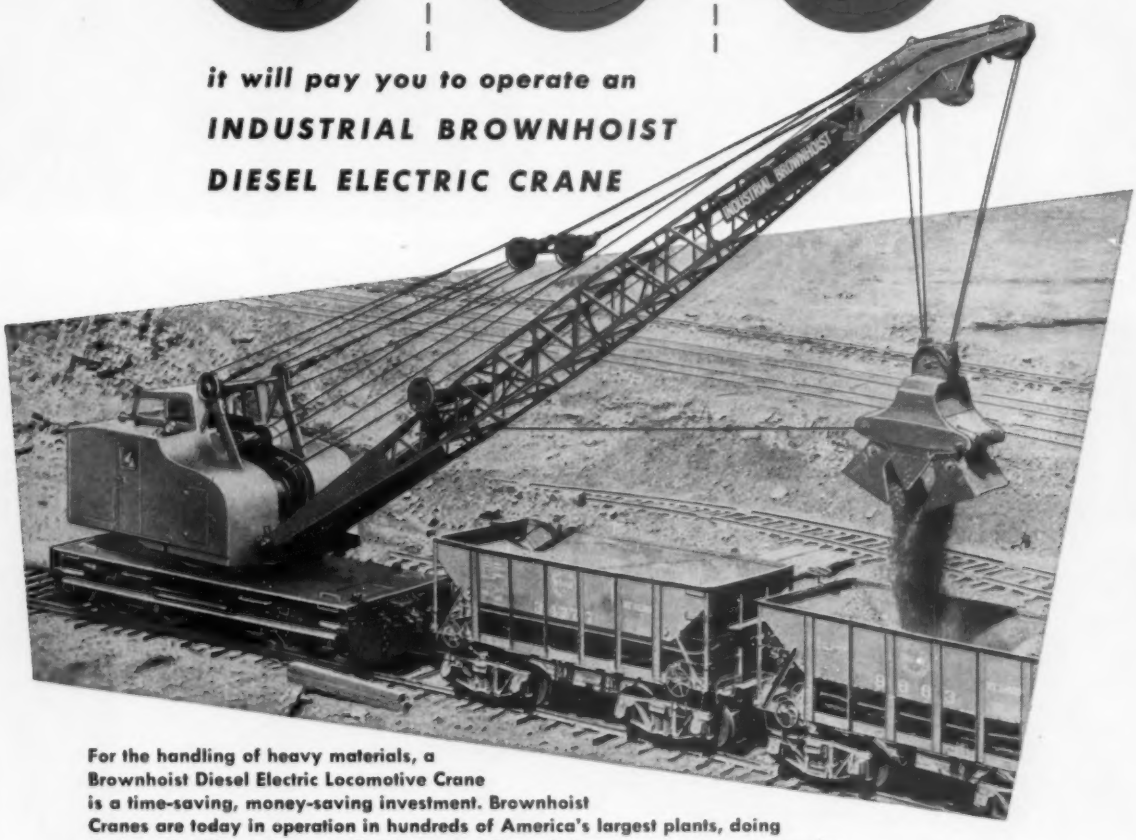
FOR LOW COST HANDLING OF HEAVY MATERIALS IN QUANTITY WITH

magnet | hook or | bucket

it will pay you to operate an

INDUSTRIAL BROWNHOIST

DIESEL ELECTRIC CRANE



For the handling of heavy materials, a Brownhoist Diesel Electric Locomotive Crane is a time-saving, money-saving investment. Brownhoist Cranes are today in operation in hundreds of America's largest plants, doing their work with a minimum of maintenance. Brownhoist cranes can save money by doubling as switch engines. They haul up to 7 or 8 loaded cars on straight and level track. All Brownhoist machines possess the famous Straight Line Power Train, which means you get the smoothest and most efficient crane operation. Brownhoist cranes give your operator greater visibility through the patented Monitor Type Cab and Clear Vision Boom, allowing him to work faster and with more safety. Electric swing available at extra cost on all models. Industrial Brownhoist Diesel Electric Locomotive Cranes are available in capacities from 25 to 100 tons. Write for Catalog No. 548.

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Nickel Plated Steel Plates will give it to you

Yes, you can get low-cost, yet effective protection against contamination and corrosion with all these chemicals...and many more!

Effective in heavy industrial applications where the corrosion rate does not exceed 0.0015 inches per year, CF&I LECTRO-CLAD Nickel Plated Steel Plates successfully combine the corrosion and contamination resistance of nickel and the economy and strength of carbon steel.

That's because CF&I LECTRO-CLAD is made by the Bart Process, which consists of electrodepositing a heavy layer of 99% pure nickel on a carbon steel plate. This process results in a permanent bond between the nickel and the steel base. The nickel plating is customarily supplied in the 8-10 mil range; however, it can be plated up to 15-20 mils, if specified.

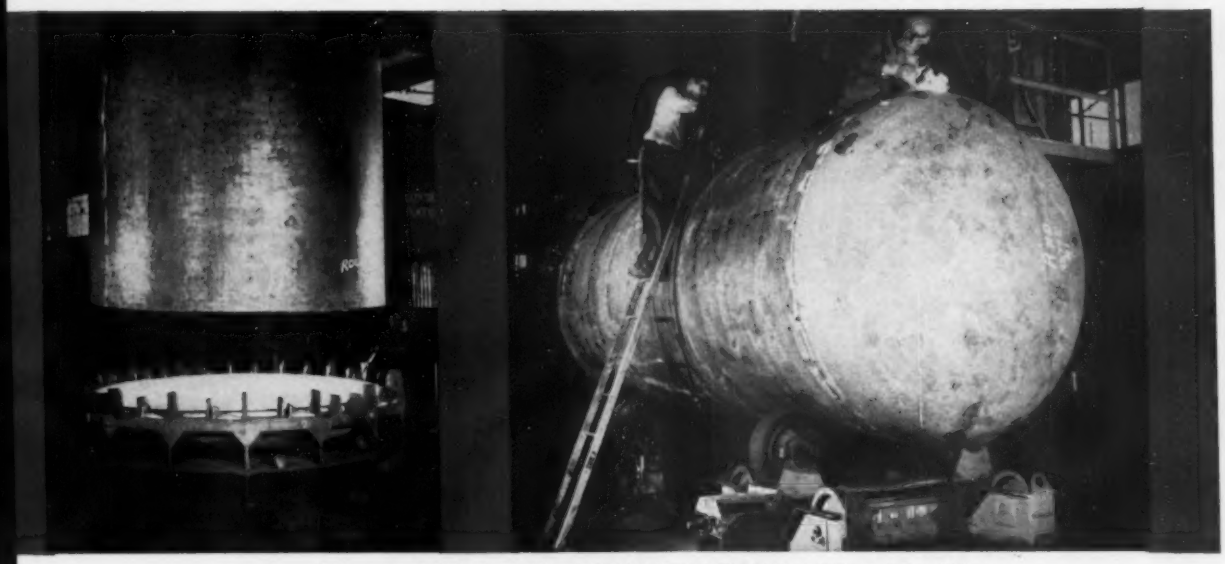
What's more, CF&I LECTRO-CLAD Nickel Plated Steel Plates are easily fabricated without costly special equipment. Just use regular shop equipment and bend it... weld it... roll it—the protective nickel layer will not check, spall or flake!

Ask our nearest sales office for the complete story on economical, effective, easy-to-fabricate CF&I LECTRO-CLAD Nickel Plated Steel Plate today. Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

*Electroplated by the Bart Process

protection against with these chemicals?

Caustic Soda • Chlorinated Hydrocarbons • Cold Hydrofluoric Acid • Dibutyl Phthalate
Methyl Alcohol • Petroleum Catalysts • Phenol • Potash • Resin Plasticizers • Salt
Sodium Sulphate • Titanium Dioxide • Tricresyl Phosphate



Assembling a tank fabricated from CF&I LECTRO-CLAD Nickel Plated Steel Plates.

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Progressive industry is today utilizing J&L's Custom-Made, **Hot** Extruded Cold Drawn Steel Sections to:

1. **Eliminate time and costs** in machining and finishing operations
2. **Reduce scrap losses** practically to the zero point
3. **Eliminate the cost of castings and forgings** of intricate sections requiring considerable machining
4. **Reduce inventories** due to quick availability of extruded sections from the J&L plant

These sections can be extruded and cold drawn to the exact specifications of the parts you require—in any quantity you specify. Even the production of a single extrusion can be economical. Obtainable in a wide range of material grades, J&L Extruded Sections can be produced in a large variety of shape profiles—within limits of a design which can be inscribed within a two-inch circle. Many shapes that cannot be hot rolled are practical for the extrusion process.

The mechanical properties of J&L Extruded Sections are equal to or superior to those obtainable from equivalent grades conventionally cold drawn. Cold drawn tolerances are accurately maintained. The excellent surfaces of these Extruded Sections require little—if any—finishing operations.

Send us your inquiry for prompt and efficient J&L service.

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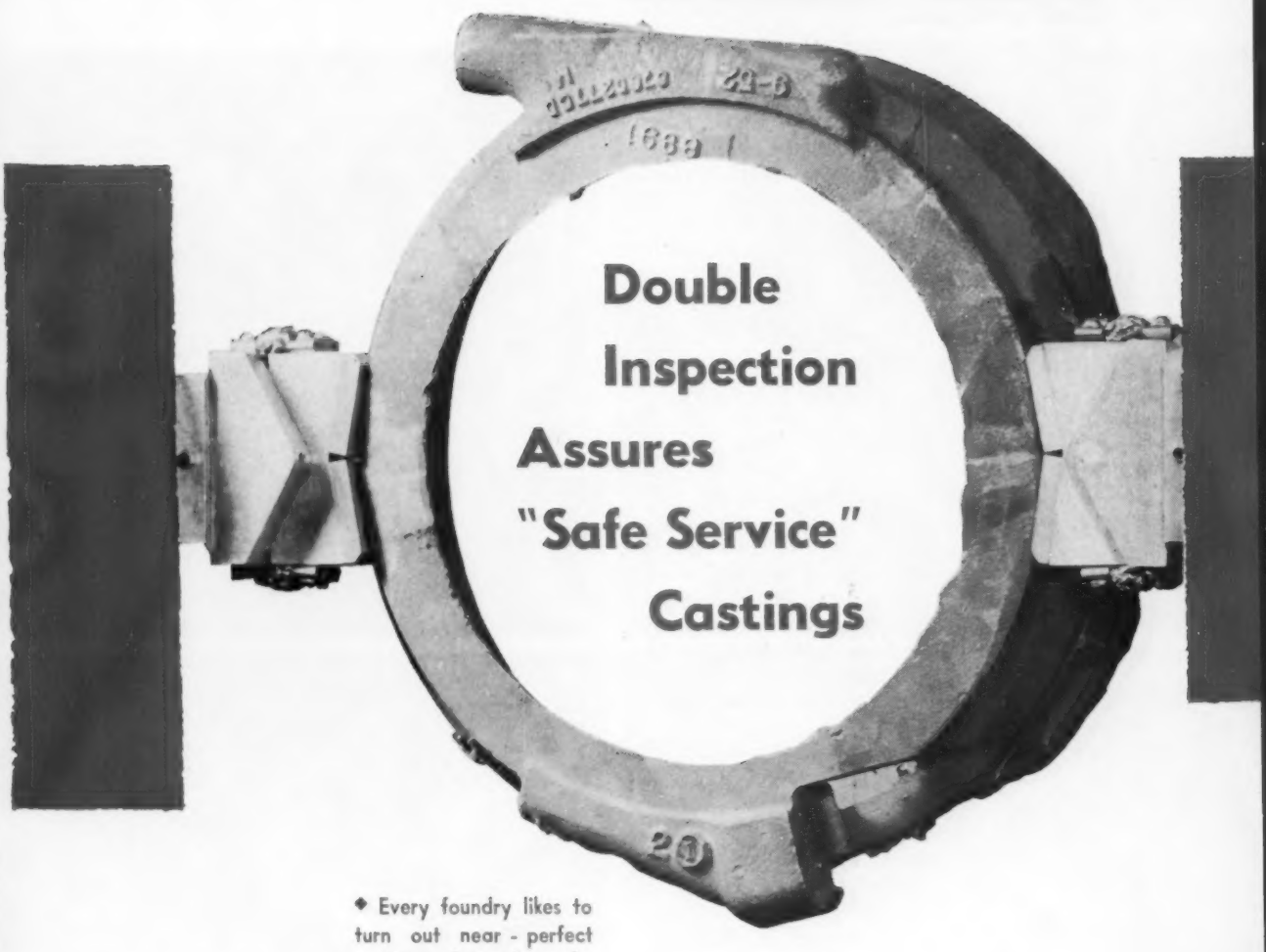


Double Inspection Assures "Safe Service" Castings

◆ Every foundry likes to turn out near-perfect castings, but when the public's safety is involved, there's no alternative . . . American Steel Foundries, makes such castings — all requiring 100 pct inspection.

◆ Special equipment handles as many as 1000 castings per day, and up to 40 different patterns in regular production. . . Now, inspection takes an average of ½ to 1½ min per casting.

◆ DEMAND that steel castings must be absolutely "free of flaws" takes on added significance when public safety is concerned. This is certainly true when the castings are used in ride control and braking equipment for railroad cars, or in highly stressed truck-tractor couplings.

The flaw-free requirement not only calls for the best in material quality, casting design and foundry techniques. It also puts a burden on the efficiency and reliability of production inspection methods and equipment.

At its Indiana Harbor Works, East Chicago, Ind., American Steel Foundries has used magnetic particle inspection methods for 14 years to check casting quality.

Value of these techniques is evident in several ways. An important factor is that Magnaglo

inspection keeps up with a 350-ton production of the 1400-ton monthly output. It handles individual castings that weight anywhere from a few pounds to 600 or 700 lb, will soon accommodate 3000-lb pieces.

It's not unusual to produce as many as 1000 castings in a day, involving 40 or more totally different patterns. But regardless of the variety in quantity, size, shape and analysis, inspection handles the job on time.

Another benefit of magnetic-particle checks for flaws is increased customer acceptance and satisfaction. In a typical example, the customer rejection rate on a particularly difficult job was gradually cut from 50 pct to less than 3 pct.

Use wet and dry methods

The foundry's magnetic particle inspection equipment consists of one Magnaglo (wet method) unit, and two Magnaflux units for dry-particle examinations. A third dry unit serves as a standby.

The Magnaglo unit was custom-designed for fast handling of parts. Unlike many, it provides over-all magnetization of the casting. Powerful air-operated contact jaws grasp and hold parts weighing several hundred pounds with speed and ease. The contacts rotate about a horizontal axis, and the complete inspection table can be rotated about a vertical axis, permitting the inspection to examine the entire casting without effort.

Because of the type of production, the plant can be labeled a "custom" foundry. About 80 pct of the castings are "problem" jobs. About 50 pct are of the plant's own design; the remainder produced to customers' specifications. The first group includes "Wearpact" castings made of a new high-hardness steel for dipper teeth, mining and road-building equipment, and other parts subjected to severe service.

Every casting made for critical service must pass Magnaglo inspection. The slightest crack is cause for rejection. However, of those which occur, most can be and are repaired, after which the casting must undergo Magnaflux inspection. On specific castings, in design experimentation and pre-production tests, x-ray inspection supplements the Magnaflux methods.

In addition to these advantages, there's another feature which is important to over-all quality control. Keeping and analyzing inspection records provides a check on casting design and production methods. Any flaw recurring regularly is the signal to examine procedures.

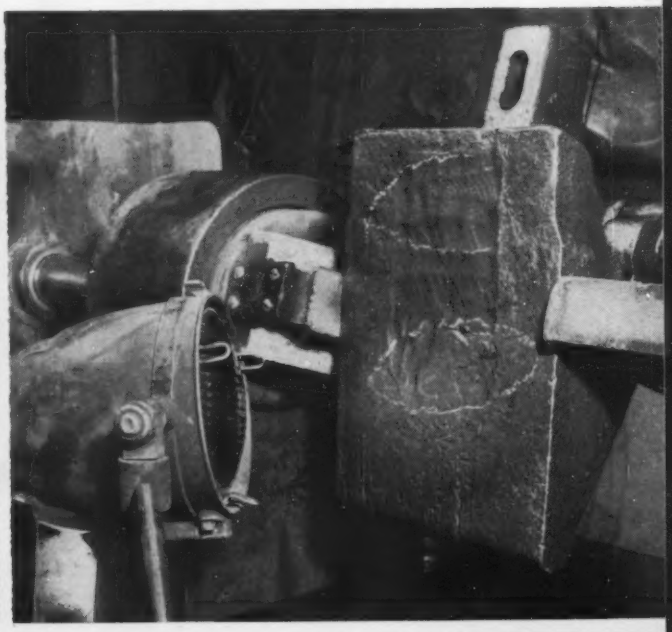
Once flaws begin to recur, they are subjected to x-ray inspection to pinpoint the cause and to develop procedures for correction. This may involve redesign of the casting, closer control over temperature or change in pouring techniques. It's this feedback of information which helps to keep quality control at its peak.

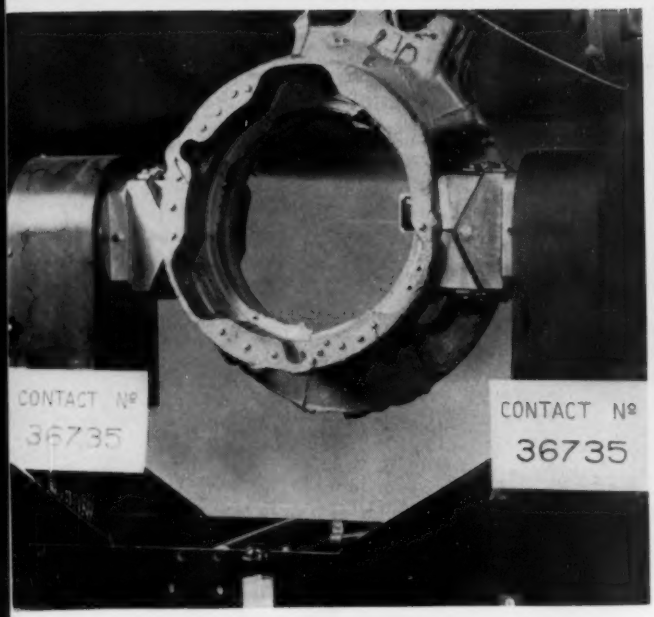
"... all sizes, shapes

Top: CASTINGS of an infinite number of shapes, sizes and compositions are inspected at this specially-designed station. Castings weighing from a few pounds to several hundred can be handled by it.

Bottom: PREPARATION of a casting for checking consists simply of wetting it down with a Magnaglo bath. The casting rotates as this is done to allow each side to be saturated thoroughly.

and steel analyses are involved."





Top: INSPECTOR checks dipper tooth of "Wear-pact" steel, a new grade possessing exceptional hardness and abrasion-resistance. 'Black' light reveals any defect by highlighting it.

Bottom: SPECIALLY-DESIGNED contact jaws firmly grasp and hold castings weighing from a few pounds to several hundred. They turn on a vertical axis while table itself turns on horizontal axis.

Top: CLOSE-UP of a dipper tooth for mining equipment reveals minor imperfections. These are marked and repaired, or rejected. No casting for severe or critical service is used unless perfect.

Bottom: SCORES of moulds with cores and pouring cups await the pouring operation. As many as 1000 castings of perhaps 40 different patterns may be poured, then inspected, in a single day.

In addition to these advantages, there's another feature which is important to over-all quality control. Keeping and analyzing inspection records provides a check on casting design and production methods. Any flaw recurring regularly is the signal to examine procedures.

Once flaws begin to recur, they are subjected to x-ray inspection to pinpoint the cause and to develop procedures for correction. This may involve redesign of the casting, closer control over temperature or change in pouring techniques. It's this feedback of information which helps to keep quality control at its peak.

Top: CASTINGS of an infinite number of shapes, sizes and compositions are inspected at this specially-designed station. Castings weighing from a few pounds to several hundred can be handled by it.

Bottom: PREPARATION of a casting for checking consists simply of wetting it down with a Magnaglo bath. The casting rotates as this is done to allow each side to be saturated thoroughly.

MELTING, refining of irony brasses are accomplished in rotary furnaces similar to this one. Method used leaves most of iron suspended in the slag at the end of each melt.

Been missing a bet?—

Make Quality Ingot From Sub-Grade Scrap—Profitably

◆ The brass ingot maker takes various grades of scrap metal, melts and refines them for foundry

◆ BRASS INGOT MAKERS can very successfully turn out many commonly-used grades of

Top: INSPECTOR checks dipper tooth of "Wearpact" steel, a new grade possessing exceptional hardness and abrasion-resistance. 'Black' light reveals any defect by highlighting it.

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How They Refine It:

1. **Charge 5 tons of clean scrap into a 10-ton rotary furnace, using ground glass, borax cover.**
2. **When charge is fluid, shovel (don't dump in) 3000 lb of irony brass scrap.**
3. **Turn off burners; rotate furnace gently back and forth through 120° arc, for about an hour.**
4. **Skim metal clean; add glass and borax, turn burners on to bring metal back to 1800-1900° F.**
5. **Add another 3000 lb of irony metal and repeat entire procedure until furnace contains about 18,000 lb of molten metal.**
6. **Take sample and adjust final chemistry.**

of brass castings such as faucets and valves, to which iron and steel parts like valve stems, washers and handwheels have been added. Iron content may run from 8 to 15 pct. Since the maximum allowable iron in the final ingot furnished foundries is around 0.25 to 0.35 pct, it's understandable that most ingot-makers have steered clear of irony brass.

Yet economics often argues for its use. California Smelting & Refining feels the interrelationship of prices between new copper and scrap is usually such that irony brasses can be more economically used in the manufacture of brass ingot than in the conversion to copper, with its attendant sacrifice of the zinc, tin and lead found with copper in most alloys.

Major uses

The company, primarily a manufacturer of brass plumbing alloys, has used the iron-contaminated brass materials in the making of 75-2-7-16 and 79-3-7-11 alloys (numbers denoting percentages of copper, tin, lead and zinc in their content).

Procedure for refining the irony brass is relatively simple:

It begins with the charging of about five tons of clean scrap into a 10-ton rotary furnace (3000 lb melt) and new glass and borax are added. Burners are turned on again and the bath is brought back to 1800 to 1900°F.

An additional 3000 lb of irony metal is now shoveled into the furnace and the procedure is repeated until the furnace contains about 18,000 lb of molten metal. Operators then take a sample and adjust final chemistry.

A moderate increase in fuel and refractory costs results from using irony scrap. But in California Smelting & Refining's case, this has never added up to more than 1.2 pct of the sales value of the final ingot.

Major deterrent to the use of irony brasses in high zinc alloys is the presence of aluminum. Such aluminum-containing material is sometimes found in typical irony brass "packages" bought from the scrap metals trade. It's effect is to greatly increase iron's solubility.

From time to time, such undetected high-aluminum scrap has caused the absorption of iron as high as 0.75 to 0.80 pct. This has averaged out to about once every 30 heats.

Where it's happened, the company has found it more economical to pour off the heat and dilute it into future batches rather than to remove the excess iron by the usual oxidation procedures. These result in almost total loss of the zinc present.

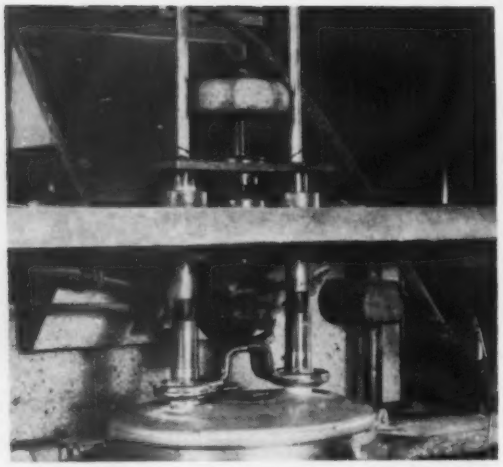
Why use irony brass?

There are two basic reasons arguing for the use of irony brass wherever possible:

First is that it permits an additional 4 to 6 pct spread on the cost of materials. The ingot maker can usually buy irony brasses on a pricing schedule which reflects only the value of the copper contained in the scrap. So if he can properly handle his raw materials, he gets the other brass constituents (lead, tin, zinc) as a cost-free bonus.

There's another major advantage. During most periods of copper shortage, during the Korean War, even during the 1948 boom in metals, the ingot maker willing to give attention to the proper handling of such scrap could operate almost without interruption.

Experience permits setting a floor under the first point. It's only when copper is cheap, below 20¢ per lb, that the additional advantage



SILVER BRAZING 2-in. long nipples to stainless steel tank with simple induction coil.

SIMULTANEOUS BRAZING of cooling coils with induction setup, preplaced filler metal.

Fewer rejects—

Induction Brazing: Advantages Justify Costs

◆ High costs of operating induction joining equipment still exist, but are less important than before . . . Now many fabricators recognize advantages of joining through selective heating possible with induction coils.

◆ In brazing, the technique lends itself well to high and low volume production . . . Most often costly investment in special handling equipment isn't needed . . . Workers like induction joining too: it's cleaner, less fatiguing.

By P. W. MORSE,
Induction Heating Dept.,
General Electric Corp.,
Schenectady, N. Y.

◆ INDUCTION HEAT certainly isn't the only heat source to join metals. But it's safe to say about 35 pct of electronic induction heater purchases end up on soldering, brazing and welding lines. A significant percentage of motor-generator sets also work in similar applications.

This surprisingly high number (despite comparably high heating costs) means induction must offer benefits generally foreign to other methods of joining metals. Sooner or later these advantages lead most metalworkers to seriously consider, if not use, induction heating as a shop tool.

So what characteristics of induction heat favor its use in soldering, brazing and welding?

First, it is selective. By proper coil design, induction heat will usually heat metal only in the immediate joining area. Comparably little heat is wasted. Undesirable metallurgical changes, such as oxidation, grain reorientation and grain growth, don't occur in unheated sections of the workpiece.

Second, it is reliable. Such variables as operator fatigue, gas consistency and human skill do not bother induction. Manufacturing rejects drop off substantially, once a heater is set up properly on a job. Production output becomes essentially uniform in quality and quantity.

Third, it is clean. Other than flux fumes from the brazing operation, no combustion products exist. Working area around an induction heater becomes a desirable place to work, often the showplace of the plant.

Fourth, it is economical. Even though induction is one of the most expensive forms of heat, economies realized through its selective heat characteristics more than compensate for its somewhat higher original cost. A better product results, as well as improved working conditions and savings in costly materials, such as silver solder.

Fifth, it shows up as a high volume production tool for many types of brazing operations. Time and again induction heat steps up production manyfold, and at the same time reduces labor cost per unit.

Soldering, brazing and welding require a temperature spectrum from as low as 350°F to 2200° or 2400°F. In brazing as in soldering, no melting takes place in the metals or alloys being joined. Molten brazing metal flows between the faying surfaces of the base metals, usually by capillary force.

Choose proper braze metal

For brazing, joining metals or alloys fall into two principal types: silver and copper, both with or without zinc, tin, cadmium, nickel and phosphorus. Approximate temperature range of the former normally lies between 1175°F and 1550°F, and of the latter between 1550°F and 2150°F.

Basically, melting point of the filler metal must fall sufficiently below melting point of base metal to flow freely at brazing temperature. In closely controlled furnaces, a 50°F differential suffices. But usual practice allows at least 200°F.

In addition, brazing metal must wet base metal parts easily. Any oxide formed on the molten braze metal must flux easily. Finally, braze metal must dissolve little gas.

Requirements of base metal include not only a higher melting point than the filler metal, but also a chemically clean surface. This also means the surface must be free of oxides at brazing temperature.

Borax fluid at 1400°F dissolves oxides of iron, copper, tin and zinc. Alkali bifluorides dispose of oxides of chromium on stainless steel, and oxide on aluminum bronzes. Regardless of flux type it should be thin liquid at brazing temperature to prevent inclusions and to insure oxide removal.

Resulting braze bond joins by slight diffusion of brazing metal and the hot solid base metal. Surface alloying of the base and braze metals produces a much stronger bond than is obtainable with only a cast metal bond within the joint.

Fundamental rule for estimating electrical power required in induction brazing is simple: Energy for brazing two pieces of metal varies directly as the weight of metal to be heated.

To calculate generator output needed on a

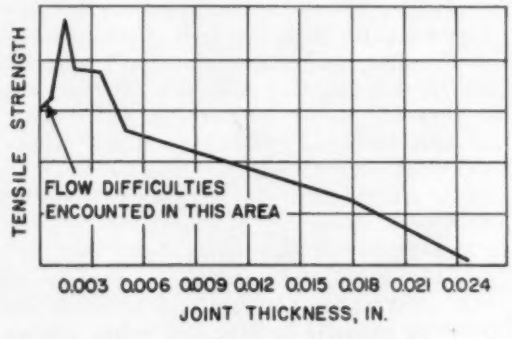


FIG. 1—Clearance between faying surfaces affects final joint strength substantially.

TABLE I

Metals Commonly Brazed
Density
And Heat Absorption

	WEIGHT lb per sq in.	kw-hr/lb (to heat from 70°F to 1400°F)
Aluminum-bronze	0.290	0.043
Beryllium-copper	0.297	0.039
Brass	0.316	0.039
Bronze	0.318	0.038
Copper	0.320	0.039
Inconel	0.307	0.048
Monel	0.319	0.050
Nickel	0.321	0.049
Nickel-silver	0.316	0.045
Steel (including stainless)	0.284	0.060
Tungsten carbide	0.44	0.021

TABLE II

Average Coupling Efficiencies

	R.F.—500 kc		MG—10 kc	
COIL TYPE	Magnetic Steel	Other Metals	Magnetic Steel	Other Metals
Helical (around work)	0.80	0.60	0.75	0.50
Pancake	0.50	0.30	0.35	0.25
Hairpin	0.60	0.40	0.45	0.30
*Transformer Coils (one turn-around work)	0.70	0.50	0.60	0.40
Channel	rarely	used	0.35	0.25
Internal	0.50	0.25	0.40	0.20

* Includes transformer losses.

brazing production line, this figure is multiplied by number of joints brazed hourly, then corrected to reflect efficiency of the operation. The formula given nearby permits close approximation of actual power requirements.

Note this equation assumes continuous power, possible with a two position setup or a continuous machine. With a single heating position, allow time to load and unload the coil.

In calculating the metal weight to be heated, a bit of background on induction helps. The induction coil causes flow of an electric current in the adjacent load, primarily on the surface. Such a current generates heat (I^2R loss) in this surface. Thermal conduction in the metal helps convey heat to all joint surfaces.

Both sides of a joint should rise to brazing temperature as uniformly as possible. Do not rely on filler metal to melt and conduct heat from the hot to the cold side of the joint.

Unfortunately, a large fraction of the heat generated may also be conducted other than toward the joint. For this reason, a good deal of energy wastes away heating metal volumes not adjacent to the joint to be brazed.

In a small workpiece, metal weight to be heated can comprise the entire volume of the part. In other cases, experience can best tell the figure to be used.

It's clear that in some cases the greater part of the workpiece mass must rise to brazing temperature to bring the entire joint surface up to temperature. In addition, temperature of the heat generation region must be appreciably higher than brazing temperature to assure proper heat flow.

Once weight of metal to be heated per hour is calculated for one brazing operation, Table I makes it easy to convert this figure to a theoretical kw-hr requirement. Heat absorption of the metal in the right column shows power required to raise a pound of metal from 70°F to 1400°F, satisfactory for a large number of joining jobs. For example, an hourly production of 100 lb of brass requires 3.9 kw-hr.

Power required =

$$\frac{(N \times W) \times (\text{heat absorption of metal})}{\text{coupling efficiency}}$$

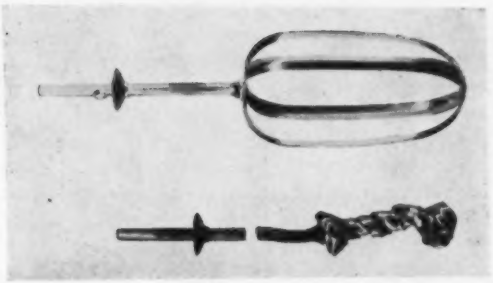
N—brazed joints per hour

W—metal to be heated per joint (lb)

Heat absorption—
kw-hr required per lb to raise metal being heated to brazing temperature

Coupling efficiency—
fraction of generator output converted to useful heat in the load

Power required—
kw-hr required out of generator



BEATER STEM failed before induction-soldered joint in tensile strength test.

Introducing the coupling efficiency into the equation now gives a realistic figure applying directly to the rating required of the induction heater. Average coupling efficiency figures (Table II) assume that spacing between coil and workpiece is small compared to either piece or coil dimensions. High voltage coils normally clear parts by ⅛ in. to ¼ in. Transformer-coupled coils permit somewhat smaller clearances.

Check coupling efficiency

With hairpin or channel coils, Table II assumes the work occupies 50 pct or more of the area enclosed by the coil. Thus the 100 lb of brass previously mentioned displays a coupling efficiency of 0.60 in a helical coil powered by a radio frequency or electronic generator. Expressed in terms of generator output capacity, approximately 6.5 kw (3.9 ÷ 0.60) will braze joints comprising 100 lb of metal per hour.

Soft soldering calls for about one-third the power required for brazing.

In designing joints for brazing, take care that clearances are suitable. Note in Fig. 1, a joint below 1½ mils thick limits capillary action of the molten brazing alloy to a poor flow, resulting in reduced joint strength. Above 6 mils thickness, joint strength largely reflects that of the silver braze metal. Shooting for a joint clearance greater than 1½ mils and less than 6 mils seems most likely to produce consistently acceptable brazements in production.

Based upon known domestically installed capacity of induction heaters, it's conceivable that as much as 1,200,000 tons of metal are involved annually in induction metal joining process. This tonnage seems destined to increase at a steady rate.

Pneumatic Jigs Help Keep Machines Busier

◆ MULTIPURPOSE JIGS boost machine productivity and improve flexibility of drilling and milling setups at the Jackson, Mich., plant of Clark Equipment Co. Air-operated chucks substantially jack up speed on drilling of cotterpin holes in one operation, and cutting keyways in another. Variety of interchangeable bushings and readily adjustable shaft mounts enable drilling transmission stem pinions of varying design in high volume.

Logged machine idle time now more nearly reflect preventative maintenance shutdown, with loading and unloading time pared to a few seconds per workpiece.

The fixture clamps and centers workpieces with air-operated chucks. Spring-loaded heads position the pinion shafts until air is applied.

Bushings guide twist drills accurately into shaft ends. Alternate bushings fit drills of different sizes. Bushing holder aligns guide hole so its axis is vertical and also in the same plane with the workpiece centerline. This assures truly radial drilled holes. One support adjusts to workpieces of different shaft lengths.

Downfed pneumatically

One head of a twin-spindle Buffalo drill-press does the drilling job. After positioning a stem pinion, the operator trips an air valve manually. Centers then clamp the work. At the same time, air supplied to a Bellows attachment feeds the drill downward.

Following drilling, the same pneumatic device retracts the drill from the workpiece. If required, the part indexes 90° for drilling of a second hole.

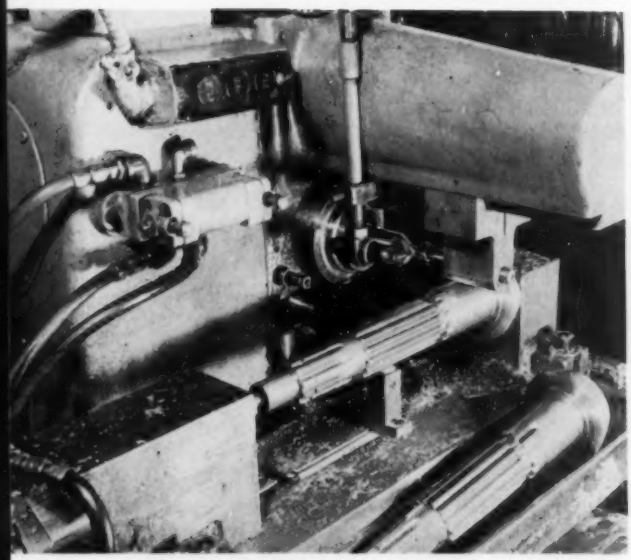
While drilling proceeds, the operator has plenty of time to chamfer hole ends on the prior workpiece. A tool in the second spindle handles this.

In a later keyway cutting job, a Cincinnati rise and fall milling machine works in conjunction with a somewhat similar fixture, also pneumatically powered. There a fixed center accommodates the large end of the stem pinion. An air-operated chuck presses against the part's opposite end. Block holding the movable center adjusts to fit pinions of different lengths.

At times, keyways must locate at a specific angle relative to splines. A locator block assures this. On loading the pinion, upper end of the locator engages spline root at the proper height. This positions the shaft accurately so keyway cut falls within circumferential tolerances called out on the drawing.

After loading, the operator presses a start button and the miller runs through its key cutting cycle automatically. Setup time for the several keyway designs consumes only a few minutes each.

Both milling and drilling operations rely mainly on pneumatic jigs to maintain production speed. Rapid handling helps this. Flexible nature of jigs also contributes, since fewer changeovers are required.



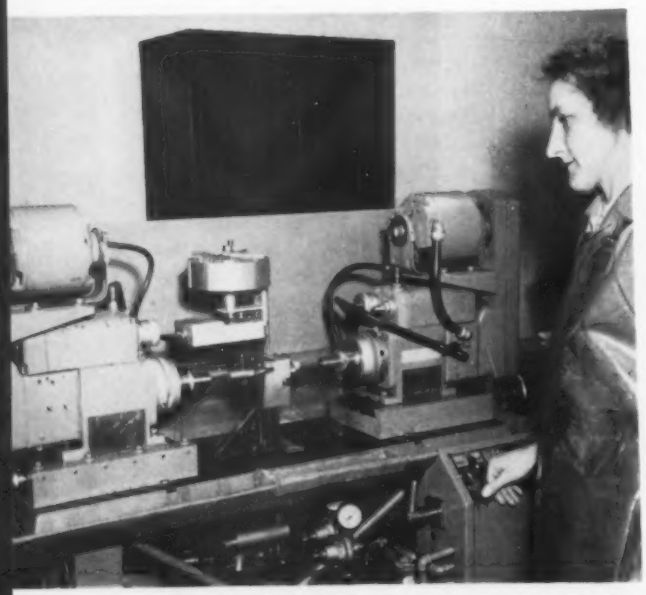
PNEUMATIC CYLINDER (l.) clamps and centers pinion shaft for automatic keyway cutting operation.

Hold 0.0002 in. tolerance—

Hydraulic Heads Double-Chamfer Two Parts A Second

◆ Installed in a new plant, shop-built equipment chamfers two opposing bore faces at 6000 to 8000 hourly . . . Simple, sturdy construction holds chamfer concentricity within ±0.0002 in.

◆ Fully-automatic, twin-opposed heads flash forward, then back, in one-half second cycle . . . Tools last 90,000 parts between grinds . . . New design boosted production 26 times above that possible earlier.



OPPOSED HEADS feed simultaneously to double-chamfer 6000 to 8000 workpieces hourly.

◆ DOUBLE CHAMFERING of opposed workpiece faces progresses at 6000 to 8000 hourly on a shop-built setup at Miniature Precision Bearings, Inc., Keene, N. H. Hydraulically-balanced heads advance together in a horizontal plane to press paired 8-flute chamfering tools against two parallel faces. After chamfering, tools retract automatically. The entire cycle runs less than one-half second.

In removing 0.010 to 0.012 in. stock, equipment holds tolerances within ±0.001 in. on miniature bearing inner races ranging in bore diameter from 0.050 to 0.290 in. The 45° chamfer and bore concentricity fall consistently within ±0.0002 in. of one another.

The setup replaces a tedious manual double-chucking operation necessary earlier. After chamfering one bore face, workers loosened a collet by hand to reverse the workpiece. This brought the opposite face beneath the chamfering tool. Production then rarely exceeded 300 parts in an 8-hour shift.

Rejects down substantially

An impressive reduction in manufacturing costs accompanied the 2600 pct production increase. Current inspection rate reflects this. Both then and now, workers gage parts at least twice—first at the machine, and at least once more prior to assembly.

Certain inaccuracies inherent in the earlier manual operation demanded 100 pct gaging at the machine. Reject rate while not unduly high proved costly.

Following installation of fully automatic chamfering equipment, the quality control group began running new inspection curves. Improved accuracy of the operation showed up immediately. This encouraged introduction of statistical quality control methods on the job.

Inspection rate dropped rapidly from 100 pct. It now hovers between a 3 and 5 pct sample of each lot.

In the operation preceding, cutoff machines bore and slice inner races from solid stock. Materials commonly used are SAE 52100 high carbon chrome alloy steel, AISI type 440 stainless steel and a beryllium-copper alloy.

Workers pour unhardened bearing inner races into a bucket-type hopper. Around inside of hopper rim runs a tapered helix groove just wide enough to admit a succession of workpieces rolling on their OD. Thin gage wire brushes arranged in vertical planes 90° apart agitate hopper load, sweep races toward the helix groove. Brushes twirl at 1½ rpm, powered directly by a fractional horsepower motor drawing line current from one of two electric motors actuating the hydraulic feed.

Workpieces feed one by one along the helix groove and into a loading slot. They then drop vertically through the loading chute to a recess in the holding fixture.

Body of holding fixture is age-hardened cast iron. Low carbon steel makes up remainder of fixture, except for replaceable workpiece clamps of tool steel.

Immediately after part falls into place within the fixture, hydraulically-actuated shoes momentarily press inward to position it. A split-second later, movable workpiece clamp sweeps forward to press part on opposing faces between it and a fixed clamp. Holding clamps resemble buttons, pierced so chamfering tools can pass through to reach workpiece faces.

Hydraulic pressure of 65 psig suffices to prevent rotation of bearing race during chamfering. Heads feed under 25 psig pressure. Two motors power individual hydraulic pumps, one for each head. One motor also supplies pressure to the holding fixture.

While clamping occurs, two opposed Rockwell hydraulic heads begin to feed toward one another and the workpiece between. Heads can throw a full 3 in., but normally are set for ⅜ in. Feed rate adjusts by a calibrated dial up to 20 fpm.

Prior to operation, feed pressures of each hydraulic pump are carefully balanced. This to assure not only synchronized throw, but also matched performance in chamfering. Dial verniers cut time on this job to a minute or so.

Cutting tools spin between 1200 and 2000 rpm, powered by ⅓ hp motors operating on 220v, 60 cycle current. Type 440 stainless calls for speeds between 1700 and 2000 rpm. In double-chamfering SAE 52100, tools spin at 1200 to 1500 rpm. Coolant is low viscosity oil.

Feed rate of cutting heads runs about 5½ fpm on all materials. This standard avoids multiple adjustments on every change of bearing material or design. It's recognized that feed rate represents another potential variable that can be altered on special jobs for easier or faster cutting.

Discharged pneumatically

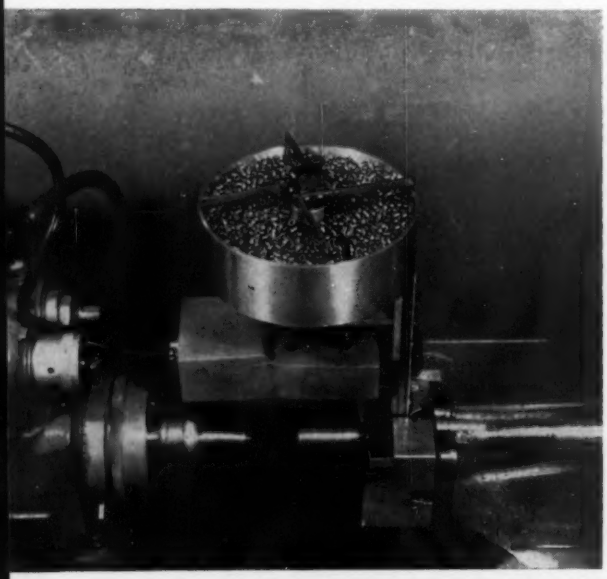
On hitting a limit switch, chamfering heads withdraw simultaneously. Before retraction ends, hydraulic clamping pressure on workpiece cuts out, and springs expand button-type chucks. An air blast topples part from position, and into a trough beneath.

Cone-shaped chamfering tools both spin clockwise, or in opposite directions when facing one another. High speed tool steel now performs the cutting job, but a shift to carbide may take place later. Tools average 90,000 parts between regrinds.

The same cutting head handles all chamfering, regardless of bore diameter. Operators make some effort to alternate lots, so each setup calls for chamfering on a different diameter. In this way, each of the 8 cutting flutes wears evenly along its full tapered length.

Difficulty in this job involved not only high manufacturing time and costs, but also close tolerances. While chamfer tolerance of ±0.001 in. isn't tight for miniature bearings, concentricity requirement gave frequent trouble.

One standard automatic machine tool tested chamfered one surface, then flipped the workpiece with a pickup arm for a cut on the opposite side. While production speed on this equipment met minimum requirements, concentricity troubles again entered. The two hydraulic heads plus an assortment of special fixtures solved the problem. Fixtures cost about $300 each, built in the shop.



BEARING RACES chamfered concentric within ±0.0002 in. to OD feed from hopper every ½ second.

Tolerances to 0.0005 in.—

Machine Rough- And Finish-Grinds Castings Automatically

◆ Retooling for brand new products or major changes offers challenging production-improvement opportunities . . . Here's how a new, automatic grinder helps this large firm meet one phase of its production problem—that of surface grinding, lapping pump covers and pump bodies.

◆ Machine features a unique parallelogram-type head suspension in addition to automatic transfer, gaging and wheel dressing . . . Automatic transmission surfaces are so smooth that gasket seals have been eliminated.

By W. G. PATTON, Engineering Editor

PUMP COVER castings are manually fed into this two-spindle, fully automatic Mercury grinder. Automatic air gages control rough and finish grinding wheel positions, wheel dressing operations.

◆ MODEL CHANGEOVERS or major design modifications offer large-production plants a golden opportunity. They can retool to use the most modern machines and methods available to meet large production requirements. At the same time, they can provide the high-quality work so essential in assuring reliable performance.

Tooling engineers at Detroit Transmission Div., Willow Run, Mich., found such an opportunity with the introduction of the 1956 Hydra-Matic automation transmission, an entirely new engineering design.

New grinder brought in

They took full advantage of it. A two-spindle Mercury grinder serves as an excellent example of the new tooling methods introduced. This surface grinds the gray iron castings used for the rear pump cover, the rear pump body and the front pump cover of the transmission.

In each of these applications flatness specifications call for less than 0.002 in. deviation. In regular production, flatness readings of 0.0005 in. are frequently obtained after finish grinding and lapping.

Castings are soft gray iron in the range of 131-187 Bhn. After manual loading, the castings are rough and finish ground and transferred automatically. Gaging and wheel dressing is also fully automatic.

Essentially, the new grinder consists of two rotating, work-holding fixtures, one for rough grinding and the other for finish grinding. These are tied in with automatic transfer equipment and automatic feed-back gaging equipment.

Manual loading of parts is employed. From this point until the castings are transferred automatically to a Buhr transfer machine for final drilling, reaming and facing operations, transfer and grinding of the surface of the castings is fully automatic.

Operating sequence

Operations in the cycle include:

1. Loading, face up in the fixture.
2. Automatic transfer to the rough grind position.
3. Rough grind.
4. Automatic transfer to finish grind.
5. Finish grind.
6. Automatic transfer to unloading station.
7. Automatic unload.

Since amount of stock removed varies somewhat with the casting, the production rate also varies.

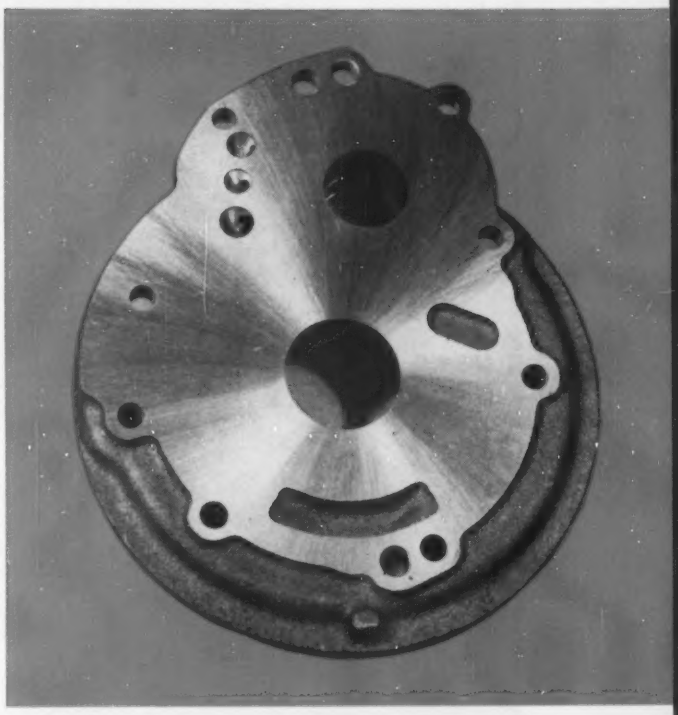
A dual function has been built into the automatic gaging devices which (1) check for proper chucking of the work and (2) control size.

The first check insures that the work is properly held by the rotating hydraulic chucks. If the gages can be lowered within ⅛ in. of the finished level, the heads come down automatically and grinding proceeds. However, if the casting is chucked improperly and the gages cannot be lowered to this position, the machine stops automatically with the heads in the up position. A pilot light signal informs the operator that production has stopped.

After determining that castings are properly chucked, the heads lower automatically. The unique parallelogram-type suspension heads feed down of their own weight, against a hydraulic cushion. Carbide-faced gage shoes "ride" on the piece throughout the grinding cycle, providing a constant size indication.

As wheel wear occurs, the dials of the Sheffield Lectrolair gages controlling each wheel indicate if the piece is within 0.001 in. of high size limit at spark out. If so, a signal is fed back. At the start of the next cycle, the wheel is fed down further to compensate for abrasive wear.

A time signal setup controls wheel dressing. When five timed downbeats are fed back during a grinding operation, wheel dressing occurs automatically in each or both of the wheels.



TYPICAL of gray iron castings used in GM's Hydra-Matic transmission, this casting requires an exceptionally flat face. Flatness readings of 0.0005 in. are frequently obtained.

The machine has two hydraulic circuits, each of which is served by a 3 hp pump. Maximum pressure on the circuit is 1100 psi. Maximum delivery is 1120 cu ipm. Capacity of the hydraulic system is 25 gal.

The head hydraulic circuit retracts the grinding wheels at the completion of the cycle and also serves as the controlling hydraulic cushion against which the heads are lowered by gravity.

The transfer pump actuates the system for transferring the workpiece from station-to-station as well as the hydraulic chucks.

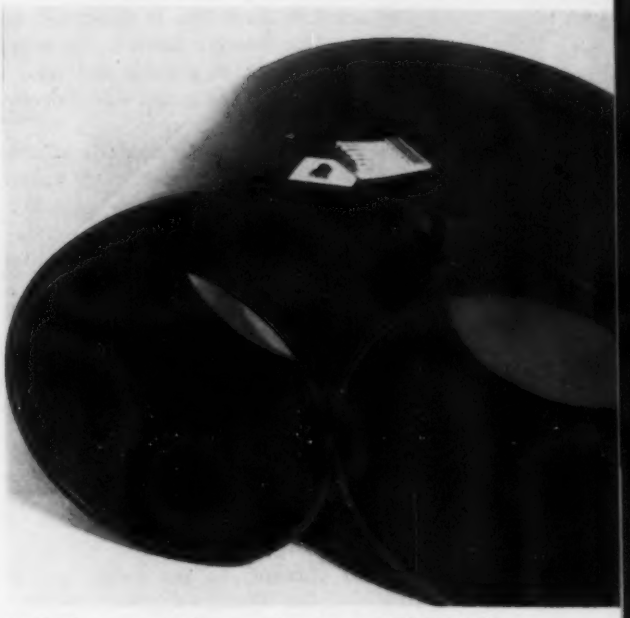
Coolant used is a water soluble oil emulsion with a rust inhibitor additive.

The amount of metal removed during grinding varies from about 0.060 to 0.110 in. Normal metal removal is in the range 0.070 to 0.080 in. For a typical grinding operation, two grinding wheels 24 in. OD and 16 in. ID x 2½ in. are used.

In the case of the rear pump cover, following rough and finish grinding, castings are fed automatically through a transfer station. In the Buhr transfer machine, a number of operations are performed, including drilling, reaming, facing and automatic gaging. Completed parts are then available, if needed, for the final lapping operation that insures additional flatness and produces a finish that meets specifications of 40 microinch.

In less space, weight—

Constant Force Springs Help Uncoil Design Problems



LARGE constant force spring stores 30,000 ft-lb over 75 ft length. Smaller is 3/16 in. diam.

◆ Here's one for designers, production people—constant force springs . . . They reputedly work at constant force throughout their full extension, even if a hundred feet long . . . Work output is almost constant and self controlling.

◆ These springs can mean more power in less space . . . In some cases, they may eliminate the need for costly motors, governors and gear trains . . . They also offer improved motion transmission and more economical production.

By C. B. MOORE, Associate Editor

◆ CONSTANT force springs resemble ordinary springs at first glance. Yet, their characteristics are so vastly different that there's actually little similarity. In fact, it's these differences both in characteristics and performance which open entirely new uses for the constant force springs.

In a conventional extension spring performing within its elastic limits, the force required to stretch it increases progressively. Contrarywise, lengthening a constant force spring from 1 to 2 ft seemingly calls for the same amount of work as extending it from 10 to 11 ft, or even from 100 to 101 ft.

On retracting, the spring exerts almost constant force throughout more than 99 pct of its length—again contrary to normal expectations.

In some applications, constant force springs handle jobs which previously required heavier and bigger coil springs of standard design. In other cases, the spring reportedly replaces gear trains in transmitting motion from a rotary drive to an oscillating arm.

Since the spring stores force, and releases energy continuously and smoothly, it's said to be supplanting spring-wound motors in some instruments, gages and test equipment. Where space and weight problems enter, there's some reason for the springs to replace even small electric motors.

Technical limitations of the development are few and apparently established. Costs run slightly higher than conventional springs. In justifiable applications, weight and space savings frequently offset this price factor. In addition, design time as well as design complexity can drop.

Outwardly, constant force springs aren't im-

pressive. In their relaxed state, they resemble tightly coiled metal bands.

It's only on test equipment and in actual use that their true nature appears. Fig. 1 shows the difference claimed between constant force and conventional extension springs.

Attach the special spring to a test setup, exert a constant force, and the entire spring slowly extends. Pull on a conventional spring, and almost immediately you strike a balance between work expended and work stored in spring coils. This stops further extension unless additional force is supplied.

Both types of springs supply work in retracting. Difference lies in how work is made available: constant force with one spring, and varying force with the other.

Works above yield point

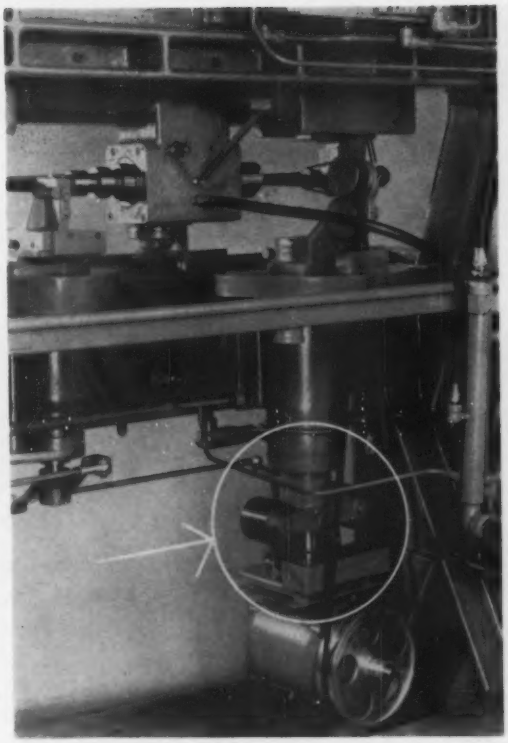
Under load, working stresses of the constant force spring appear to exceed the ultimate yield strength of the material. There's a catch naturally, but conventional load tests don't reveal it, according to the developer, Hunter Spring Co., Lansdale, Pa.

This spring development can help ease many design problems for product development people. They find use on the production line as well.

Machine tool ways always present problems. They must be flat within close limits to hold part tolerances. Way shields prevent chips and shavings from scoring and marring the polished way. But sometimes such shields are not easy to design.

Lightweight constant force springs can handle the situation. In bands 4 in. wide, the springs sit atop ways to shield them completely. Two springs do the job, one end of each fastened to opposing ends of the way. Cavities in the machine carriage house spring coils. Multiple ways call for additional spring pairs.

A side benefit shows up in this application.



CONSTANT FORCE spring counterbalances 50 of 60 lb grinder motor, also maintains belt tension.

Springs exert equal forces on opposite sides of the machine carriage, effectively counterbalancing one another. No additional load is imposed on the carriage.

This counterbalancing feature can apply in such diverse equipment as furnace doors, inert gas welding chambers, plating racks, flame cutters, grinders, wheel dressers and machine tools.

A Van Norman Co. hydraulically-operated

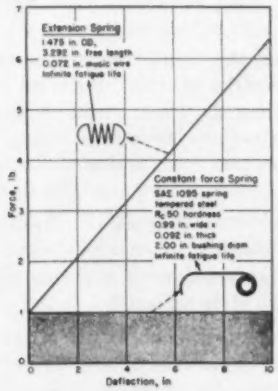


FIG. 1—(Left) Force to extend conventional spring climbs rapidly. Nega'tor load stays same.

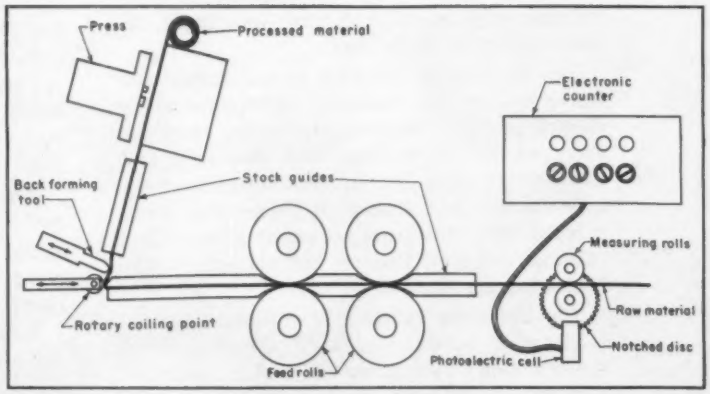


FIG. 2—(Right) Coiling point and backformer control stress levels in forming. Contact angle is critical.

Constant Force Springs Find Metalworking Uses

- **Anti-backlash gear trains**
- **Cam follower mechanisms**
- **Belt grinder counterbalance**
- **300°F oven door**
- **Machine tool way shields**
- **Flame cutter scribe drive**
- **Wheel dresser grit retainer**
- **Liquid level indicator drive**
- **Contour wheel dresser counterbalance**
- **Pump cylinder pin retainer**
- **Welding jig clamp**

wheel dresser, for example uses the coiled bands to counterbalance blast nozzle weight, and as slot closures to control spraying of grit. Blast nozzle must move through several inches to permit grit to strike all surfaces of the wheel being dressed. Spring bands hug both sides of the slot closely. As the blast nozzle oscillates, springs extend and retract in fashion similar to the machine tool way application previously mentioned.

In a Pratt & Whitney-designed turbine blade grinder, the springs compactly counterbalance 50 of the 60 lb grinder weight, including motor and base.

Both wheel dresser and grinder need a constant force. Conventional springs seem unable to supply it. In both applications, counterweights were considered and discounted because of space limitations.

The constant force trait of the spring can lend itself to jobs normally calling for small electric motors. Such motors do the same job there as the spring can. But they may cost more, weigh more, occupy more space than the coiled bands. In a Fischer & Porter level measuring device, the spring not only meters a 35-ft cable at constant tension, but also drives the indicating mechanism.

The hydraulic cylinder of one machine tool required a return mechanism. Conventional springs didn't suit, since they might interfere with the steady force exerted by the hydraulic piston on its downstroke. A pair of constant force springs provide 300 ft-lb over a 10-in. stroke.

Three metal ribbons now replace conventional gears, belts and cables to transmit motion in one metalworker's duplicating machine design. Gears formerly drove the paper handling rollers.

Simple though the spring device looks, manufacture isn't casual. Any cold-rolled, spring-tempered stock can be used. High carbon steel (e.g., SAE 1095) is frequently specified, particularly in the greater thicknesses where it is more economical. AISI type 301 and 302 stainless steel suits all but the highest stress applications.

Where the design calls for high stresses in thin stock, 17-7 PH (precipitation hardening) stainless meets the need. Beryllium-copper and phosphor bronze have been employed. Special circumstances can call for selected grades of high yield strength AISI type 301 and 302.

Magnitude of the force exerted by the coils depends on the material, stock width and thickness, as well as stresses induced in forming and heat treatment.

Spring steel coils 0.002 in. thick and ⅛ in. wide can be stressed to exert almost any constant force below ¼ lb throughout most of their length. In widths of 4 in. and thicknesses of 0.032 in., the same material properly formed can counterbalance up to 66¼ lb. Tolerances on force made available fall within ±10 pct normally, or closer if desired.

Interleaved for more force

Half a dozen or more interleaved springs are said to increase force exerted without appreciably enlarging the volume occupied by the coils. Top load for any sound design application to date runs about 80 lb for a single spring. A several hundred pound load can be handled compactly by multiple springs.

Fatigue life seems an important factor in design and production of the coiled band. Springs designed for infinite life reportedly continue in good condition after more than a million cycles in actual service.

In forming, the metal ribbon runs past a coiling point, bending sharply. Rotation of the tool heavily stresses the sheet stock. A backforming tool then introduces reverse stresses, apparent key to the constant force action of the spring coil.

Angle of both coiling point and backforming tool is considered critical. By varying these angles and making other adjustments, a wide range of counterbalanced stresses can be induced into the strip material.

Springs temper or martemper in an air-type circulating electric oven at 400° to 900°F. Each stress level has its optimum tempering conditions, including time and temperature.

Springs normally quench in air. Total stress loss in heat treatment is slight.

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New Technical Literature:

Catalogs and Bulletins

Box sealing methods

Revised edition of "How To Seal Corrugated Shipping Boxes" booklet has recently been published. It outlines procedures recommended to cut losses, reduce waste, speed up and simplify sealing methods. Both hand and automatic sealing procedures are discussed including application of adhesives, gummed and pressure-sensitive tape, stitches, staples and steel bands. Sealing procedures recommended for both regular slotted boxes and specialized styles are also explained and illustrated. The 24-page publication features new format, illustrations and text material, revised to explain modern package sealing. *Hinde & Dauch.*

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 89.

Gas analysis

Data sheet describes thermal conductivity type gas analyzers with electronic recorders and controllers. These analyzers are used for combustion control, continuous analysis, or production mixing of gases. *Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 2 on postcard, p. 89

Filteration booklet

This 12-page, fully illustrated bulletin completely describes uses, design features and engineering details of pressure sand and gravel filters. Details of all accessory equipment, the different types of controls available and a detailed table giving capacities, sizes and space requirements are included. Cutaway views of both horizontal and vertical filters are shown as well as details of strainers, distributor systems and piping arrangements. *Graver Water Conditioning Co.*

For free copy circle No. 3 on postcard, p. 89

Metal marking

Metal marking machine producer has just released a new 50th Anniversary catalog containing the firm's complete line with hundreds of illustrations of marking applications. Printed in three colors, catalog includes basic technical information on metal marking, rapid production marking machines, precision graduating equipment, mechanical and pneumatic marking presses, bench marking machines, automatic numbering heads, precision marking dies and hand marking tools. *Noble & Westbrook Mfg. Co.*

For free copy circle No. 4 on postcard, p. 89

Art of grinding

Two-color illustrated folder introduces the new grinding concept claimed to overcome chatter, wheel marks, out-of-roundness and the costly secondary operations required for super finishing and lapping in cylindrical grinding. Folder lists grinding problems when work is turned on "dead" or "solid" centers. Points of the new concept are listed, and an exclusive compensatory load distribution of bearing assembly is explained. *Ready Tool Co.*

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New ARMSTRONG Armide Carbide Insert Tool Holders hold multiedged, throw away Armide inserts. They end tool grinding and reduce down time. After an edge dulls, a slight turn of the clamping screw permits rapid indexing of the insert to a new cutting edge. Triangular inserts have 6 cutting edges; square inserts have 8 edges. They are available in three grades—Armide 350, 370, or 883.

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Mini flexible couplings

Four-page bulletin describes standard and special miniature couplings for power transmission. It pictures, describes and shows dimensional drawings of miniaturized couplings which can be used on servo-mechanisms, computers and other small devices. Material specifications, dimensions, bore size, and list prices are shown in bulletin. *Thomas Flexible Coupling Co.*

For free copy circle No. 6 on postcard, p. 89

Fire brick

Just published bulletin describes types of medium duty brick. One is a dense, tough stiff mud type refractory which has wide applications for brick-lined ladles, foundry uses, chemical plants and boilers. The dense structure of this brick gives excellent resistance to attack by slag, metal, and chemicals. Another is a high quality dry press brick which is used for general furnace construction, heating furnaces, boilers, and incinerators. The uniform size and easy cutting of this brick permits easy brick laying. *The Ironton Fire Brick Co.*

For free copy circle No. 7 on postcard, p. 89

Tool catalog

This new tool catalog is 8½ x 11 in. with flexible cover and spiral binding allowing pages to open flat. It contains a complete listing of end mills, end mill holders, counterbores, new type countersinks and deburring tools, angular cutters, sharpening fixtures and high speed steel and carbide form tools. The outstanding feature of the new catalog is the progressive listing of tools by sizes, with detailed dimensions. *Weldon Tool Co.*

For free copy circle No. 8 on postcard, p. 89

Pocket-size card

A 3½ x 5¾ in. card lists physical properties of fasteners. Printed on vinyl plastic, the card gives such physical properties as steel analysis, head marking, tensile strength, Brinell and Rockwell hardness on screws up to 2½ in. diam. *Cleveland Cap Screw Co.*

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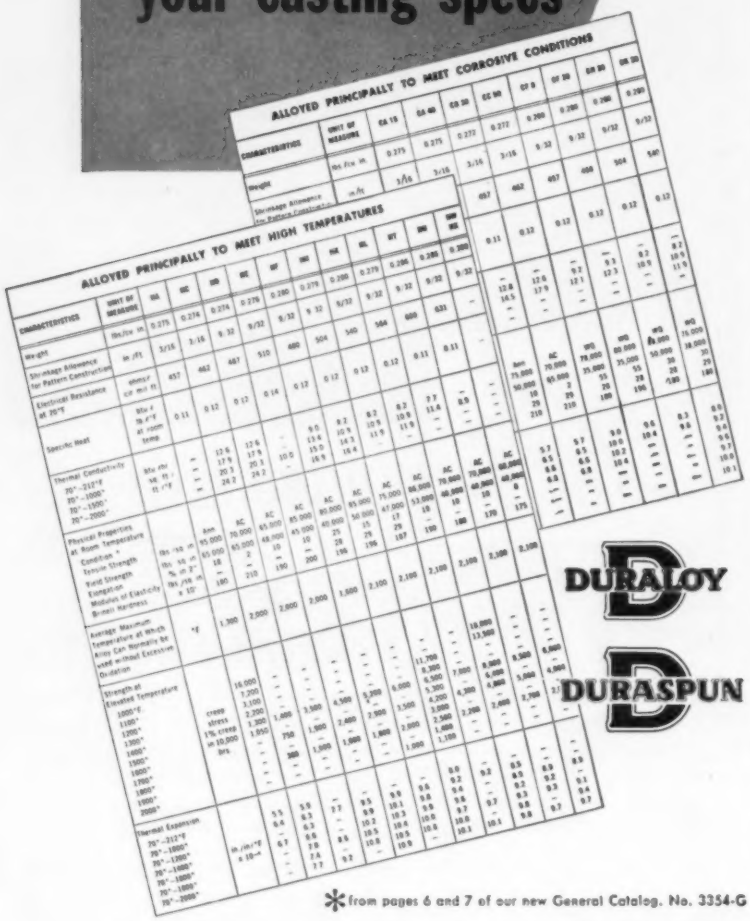
TABLES
to help you select the proper alloy for your casting specs



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FREE TECHNICAL LITERATURE

Gearmotor bulletin

Featuring late design improvements in gearmotors and embodying 60 multicolor illustrations, a new bulletin is now available presenting various types of one company's motors. Containing 16 pages, it shows comparative advantages of gearmotors, lists ratings from ⅓ to 30 hp with gear ratios as high as 10:1. Cross-sectional details of motors and enlargements of outstanding features are displayed, with emphasis to the principle of solid shank pinions, integral oil seal and methods of cutting gears specifically for Syncrogear motors. Application of elliptoidal helical gears and a chart graphing degrees of tempering and hardening of gear teeth is given. Single, double and triple reduction gears are included. *U. S. Electrical Motors Inc.*

For free copy circle No. 10 on postcard, p. 89

Strip copper alloy

Physical properties which make beryllium alloy particularly suited for applications in the electrical and electronic fields are contained in this four-page booklet. Included are these design factors: (1) high electrical conductivity, (2) service temperatures of 400°F and above. (3) excellent spring characteristics, and (4) corrosion resistance. Bulletin gives information on applications of beryllium strip for electrical design uses. Photographs with captions describe solutions to three typical electrical design problems. *Beryllium Corp.*

For free copy circle No. 11 on postcard, p. 89

Welder control

Bulletin is the first of a group to interpret company's predetermined, electronic counter welder control. Basically, the bulletin is divided into two sections—development of welder control and the specific features of a special type welder control. *Sciaky Bros.*

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Explosion proof motors

Eight-page bulletin discusses design features and maintenance of new induction motors, one through 30-hp, for use in hazardous locations. *General Electric Co.*

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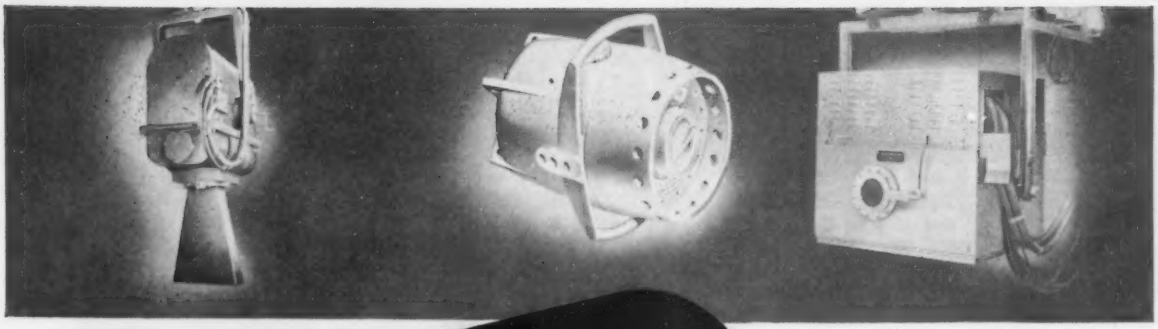

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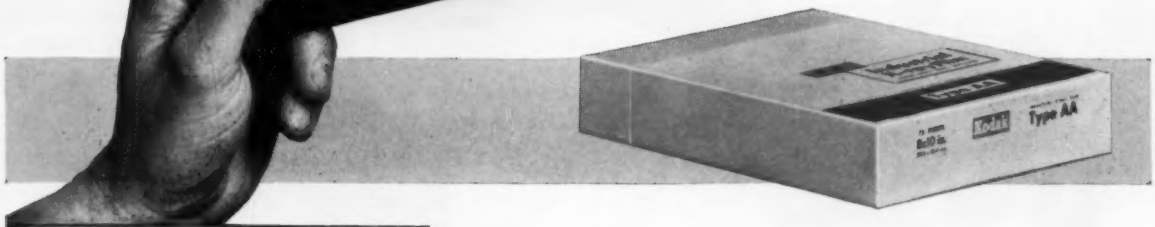

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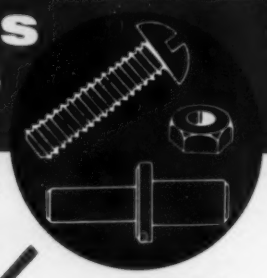

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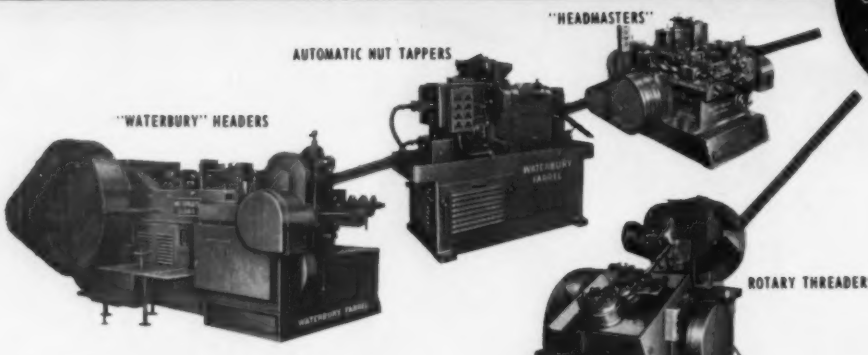

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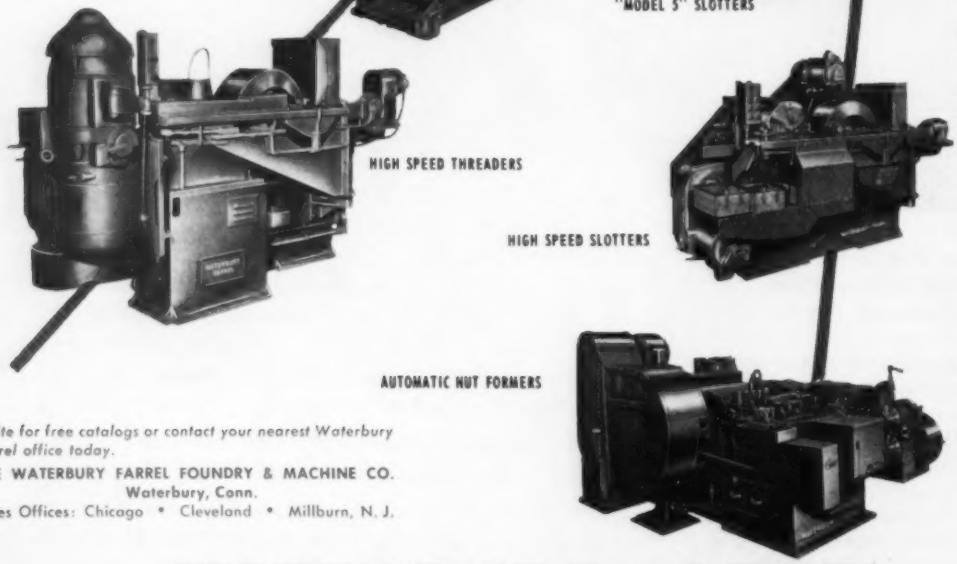

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HIGH SPEED SLOTTERS

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S.D.D.S. Crank
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FREE TECHNICAL LITERATURE

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This section starts on p. 84

Assembly machine

Brochure describing operation of company's automatic assembly machine has been published. Firm's machines are currently assembling mercury batteries. By changing the tooling, they can readily be adapted to assemble other multi-component assemblies. The 12-page two color brochure describes features of the 7000 lb machine and details its complete, part-by-part assembly of a single product. Construction, tool position and vibratory feeders around the work table, mechanical features, feed-back system, electrical controls and overall size are graphically described. *Multra Corp.*

For free copy circle No. 14 on postcard, p. 89

Algae control

Simple, low-cost methods of eliminating algae problems in cooling systems through use of a new algaecide is described in a leaflet. The algaecide is a complex organic rosin base liquid, weighing approximately one lb. per pint. It is simple to apply and safe to use. A table illustrates its effectiveness on six different species of algae. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 15 on postcard, p. 89

Steel strapping

Literally packed with information, this 44 page catalog contains everything from anchored load bands on freight cars to anchor nails. Forty-three classifications are broken-down into many more sub-classifications giving reader a comprehensive review of how steel strapping aids industry in packing, shipping and handling materials. Those interested in steel strapping shouldn't miss this. *Acme Steel Co.*

For free copy circle No. 16 on postcard, p. 89

Blind rivets

Said to be the latest development in rivets, a versatile new blind rivet is described completely in a folder. These rivets are said to offer many advantages, including wide grip range, positive hole fill, high clinch and uniform stem retention. These rivets are said to simplify inventories, since grip range is sufficiently wide that one shank length is satisfactory for all thickness of material handled by any rivet diam. Specifications, design details and proper guns and heads for applying are given. *Townsend Co.*

For free copy circle No. 17 on postcard, p. 89

Easy opened valves

"It's easier to open or close a Golden-Anderson valve than to drive a car with power steering" is the title of a new bulletin. With the aid of simple drawings, the reasons for the claim made by the title are thoroughly explained. Additional features of company's cushioned automatic valves are also covered, plus a brief resume of 11 of the firm's line of specialty valves in sizes from two to 36 in. *Golden-Anderson Valve Specialty Co.*

For free copy circle No. 18 on postcard, p. 89

Mining tools

Newly revised edition of one firm's mining tool catalog and methods manual is now being distributed. This 16-page catalog includes many new mining tools recently redesigned. Technical data on tool design, size and shape of the mining bits, roof drills and coal drills is given. A photograph and a detailed description of each drill is included in the booklet. *Allegheny Ludlum Steel Corp.*

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Lift truck trio

A trio of modern lift trucks on pneumatic tires in 3000, 4000 and 5000 lb capacities are reviewed in a new bulletin. Photographs and drawings illustrate main features, including free-lift model, dual wheels, dual trunnion steer wheels, large industrial tires, heavy-duty upright assemblies, overhead guard, "finger tip accessibility," convenient controls and rugged construction. *Hyster Co.*

For free copy circle No. 20 on postcard, p. 89

Tapping and drilling

Well illustrated brochure reviews company's automatic drilling and tapping machines. Containing 20 pages, it tells their purpose, advantages, typical operation methods, parts, components and firm's facilities. It contains 72 pictures and drawings. *Hartford Special Machinery Co.*

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Milling machines

Tracer controlled contour or conventional milling machines are subject matter of a new circular. Along with illustration of firm's vertical ram turret, combination horizontal, vertical milling machine equipped with three dimension tracer control, main features and specifications are given. *Alexson Mfg. Co.*

For free copy circle No. 22 on postcard, p. 89

Screw machines

Manufacturer has released comprehensive catalog revealing latest design and production advances in single spindle bar automatic screw machines. Catalog describes: turret and cam drive, cross and vertical slides, stock feed and collet chuck, turret slide assembly, open front design, easy set-up suggestions and a number of other advances. Catalog is illustrated with pictures, cross-sectional diagrams and cutaway drawings. A section describes sub-assemblies showing how simplicity of design insures better performance, increased production and longer life. *Gear Grinding Machine Co.*

For free copy circle No. 23 on postcard, p. 89

Radial relief grinding

Described as an entirely new concept in radial relief grinding, literature dramatically illustrates with graphic samples a new approach to radial relieving not dependent on cams. It is said to be ideal for cemented carbide tools since amount of radial relief measured in indicator drop can be controlled to 0.001. *Spati Industries, Inc.*

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Smoke density indicator

Details of company's smoke density indicator system are presented in a new bulletin. Illustrated throughout with photos and drawings, bulletin gives operating and specification data. Installation information is contained in a series of schematic drawings. Three smoke recorders that may be used with system are described. Entire system is based on a light source and photoelectric scanner installed in a stack, breeching or duct. With light source aimed at scanner, intensity of light reaching scanner is dependent on smoke density. Scanner is electrically connected to an indicator, which measures smoke density in both pct and Ringelmann number. *Electronics Corp. of America.*

For free copy circle No. 25 on postcard, p. 89

Filter bulletin

Filters for raw water, light process liquids, and centralized coolant systems are described in revised bulletin. Filters can handle up to 15,000 gpm in a single unit and can filter down to 0.0025 in. They are continuously and automatically self cleaning, require minimum maintenance and occupy small floor area. 12 pages. *Cuno Engineering Corp.*

For free copy circle No. 26 on postcard, p. 89

Wire rope manual

Revised edition of steel corporation's manual on wire rope has been completed. This 96-page manual contains extensive information on the selection, installation, and best operating practices for wire rope. *Wire Rope Div., Jones & Laughlin Steel Corp.*

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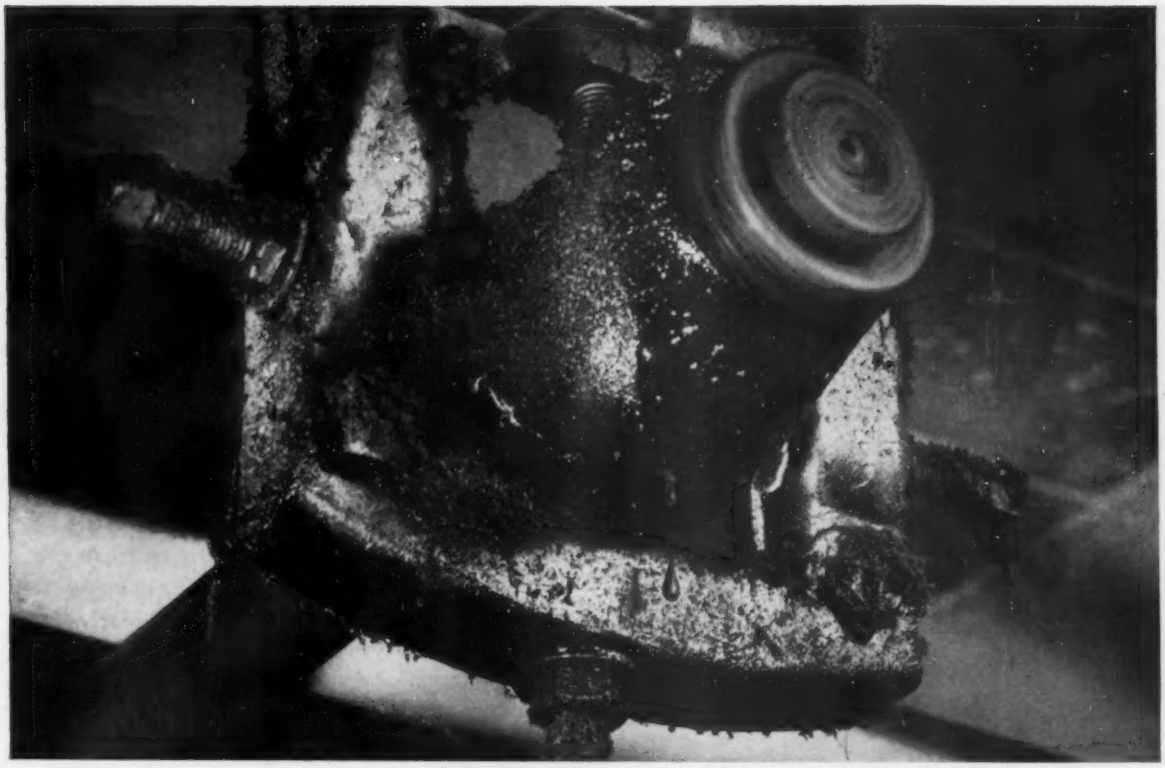

IT'S EASY to reduce annoying and expensive oil leakage like that shown here. The simple act of switching to a Suntac oil – *without making any other changes* – can cut leakage an average of 35%...sometimes 90%!

SUNTAC STOPS SHUTDOWN CAUSED BY OIL LEAKAGE

A manufacturer was having trouble with oil leakage and throw-off from bearings of overhead shafting. This resulted in hazardous conditions and low employee morale. Production had to be shut down frequently. Oil costs were high.

A switch to a Suntac® lubricating oil solved these problems.

If you're losing oil through excessive leakage from rotating or sliding parts, a Suntac oil can cut your consumption an average of 35%. These oils are especially compounded to reduce drip, throw-off, squeeze-out; their greater adhesiveness enables them to cling firmly to the parts...as they lubricate.

Suntac oils can reduce consumption up to 90% when used in hydraulic systems, circulating systems, and in other continuous use applications.

For further information on versatile Suntac oils, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-7.

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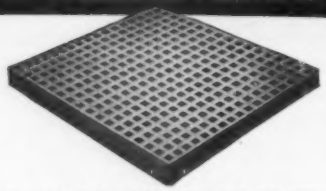

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Digest of the Week in Metalworking

HELP YOU FIND FAVORITE FEATURES

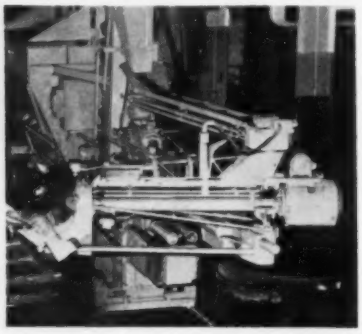
The IRON AGE

FOUNDRY: New Bullard Plant

Bullard Co. opens Bridgeport foundry . . . Viewed as the most modern in New England . . . With floor area of 1,034,000 sq ft, plant is located on 23 acres.

"In the invisible background of America's industrial progress stands the machine tool industry. Approximately three-quarters of the weight of these machine tools is gray iron which only can provide the proper combination of rigidity, strength, wear resistance and economy."

With these words began the explanation for the building of a newly opened seven million dollar foundry by the Bullard Co., Bridgeport, Conn.



Overhead traveling slinger speeds molding operation.

It is viewed as the most modern of its type in New England and one of the finest in the country. Actually, ground was broken for the new foundry in Dec. 1954 and the foundry building was completed in April 1956.

The building is 600 ft long, 240 ft wide and 62½ ft high at the top of the cupola stacks. It provides 220,000 sq ft of production, office and storage area. Thirty-three hundred tons of structural steel were required, 600 tons of steel reinforcing rod and 24,000 tons of concrete. The building contains approximately ten million cu ft. The additional 220,000 sq ft of manufacturing and servicing area of the foundry brings the company's total floor area to 1,034,000 sq ft, located on a land area of approximately 63 acres.

More than ten miles of piping service the heating, plumbing and processing operations. All piping is color coded for quick servicing. Red for fire sprinklers, blue for city water, green for recirculated mill water, orange for natural gas, yellow for compressed air and brown for oil.

Fly Ash Collectors

Cupolas are equipped with modern fly ash collectors. The fly ash is flushed through a central sluicing system that has a circulation capacity of one thousand gpm.

Coke, sand, and limestone are dumped from railroad hopper cars directly into the car unloading station from which these materials are carried in special unloading buckets to storage bins. Pig iron and steel scrap are unloaded by magnet cranes from railroad cars into the storage bins. All materials are weighed, and the weights recorded permanently on automatic print-weigh scales.

In pouring, the molten iron runs from the cupola into gas fired movable forehearths. Slag drops

WANT MORE DATA?

You may secure additional information on any item brieted in this section by using the reply card on page 89. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

into a stream of recirculated water in a sluiceway under the pouring spouts, and is carried away underground to an outdoor settling tank.

Large moulds and cores are baked in the gas ovens, where they can be loaded from the slinger floor in the South Bay, and when baked, unloaded from the oven cars in the center or pouring bay.

After pouring, moulds are carried to the shake-out systems. The sand is returned to the sand preparing systems, flasks returned to the moulding floor or storage, and castings given thorough cleaning in the casting washer, the automatic shot machine, or the shot-blast room.

Materials:

New powerful permanent magnets are promised

Scientists have perfected a magnetic material which promises to yield powerful new permanent magnets, it was announced recently by Dr. Clarence Zener, acting director of Westinghouse Electric Corp. research.

Dr. Zener disclosed that the material is virtually 100 pct pure manganese-bismuth—a chemical compound which has the formula "MnBi." He described the material as having "significant advantages over existing materials for permanent magnets" and said it is the result of a new and improved method for the preparation of the highly purified manganese-bismuth in powder form.

May Affect Design

So promising are the magnetic properties of the new material that Dr. Zener predicts it may materially affect the future design, construction and performance of many present day devices which employ permanent magnets.

"The superlative magnetic properties of pure manganese-bismuth have been predicted for several years," Dr. Zener declared. "Until now, however, the form of MnBi which best exhibits these properties could not be made pure enough to realize its potential abilities. This new method gives us,

JUST RIGHT

FOR LOW-COST PRODUCTION LIFTING

It takes fast hoisting to keep work moving to and from benches, machines and stock piles on schedule. The Series "600" 'Load Lifter' Electric Hoist operates at 30 FPM to lift ½-ton loads. It has safe 24-volt push-button control to start and stop this fast hoisting instantly. Accurate spotting is easy. The flexible wire rope permits nominal side lifts with complete safety for man, load and hoist.

If your production suffers from slow load handling, learn how the Series "600" 'Load Lifter' Electric Hoist can improve your timetable and cut your costs. Capacities: ½ and 1 ton. All types of suspension. Get details from your "Shaw-Box" Distributor or write us for Bulletin 408.

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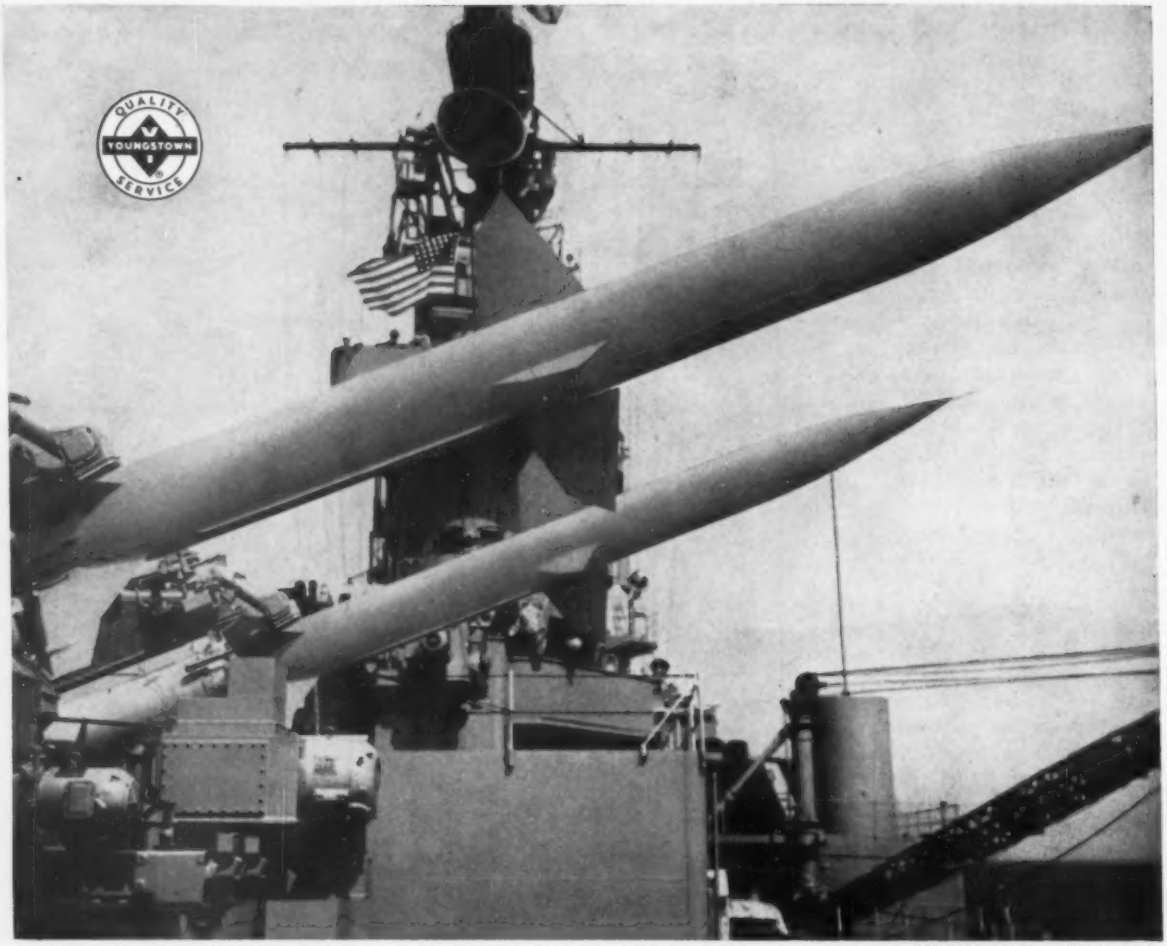

Official U. S. Navy Photograph

Supersonic tracker of enemy planes

Now guarding our coast, U. S. Navy's new guided missile has vital parts of Youngstown Alloy Sheets

Combining metallurgical skills of steelmaking with modern marvels of electronics, Terrier Guided Missiles are capable of destroying hostile targets at long range with great accuracy. The Youngstown Sheet and Tube Company is proud of participating in the production of high quality steel used in these new weapons for our naval forces.

The booster and sustaining mechanism of the Terrier are fabricated of Youngstown Aircraft Quality Alloy Steel Sheets **by the Hicks Corporation.**

Youngstown Alloy Steels are produced in a variety of forms and qualities to meet customers' specifications. Every ton is subject to a close quality control which insures uniform chemical composition and mechanical properties.

Whenever you have requirements for steel, consider Youngstown Carbon Alloy or Yoloy—sheets, bars, plates or pipe.

Youngstown

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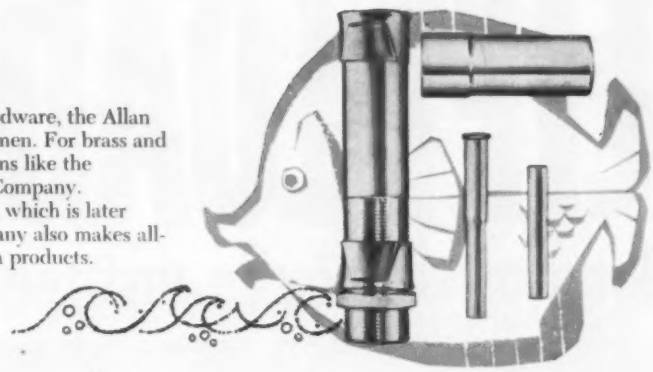
Short Cuts to Finished Products . . . *by Anaconda*

Aluminum Ferrules For Fishermen—

Allan Manufacturing Company, Hicksville, N. Y.

As the world's largest producer of fishing tackle hardware, the Allan Mfg. Company serves more than 25,000,000 fishermen. For brass and aluminum, the materials used in large quantity items like the ferrules shown, they turn to The American Brass Company. The reel seat and rod ferrules shown are aluminum, which is later anodized and colored. Allan Manufacturing Company also makes all-brass tackle hardware, using many other Anaconda products.



Red Brass Water Supply Nozzle For Thirsty Hens—

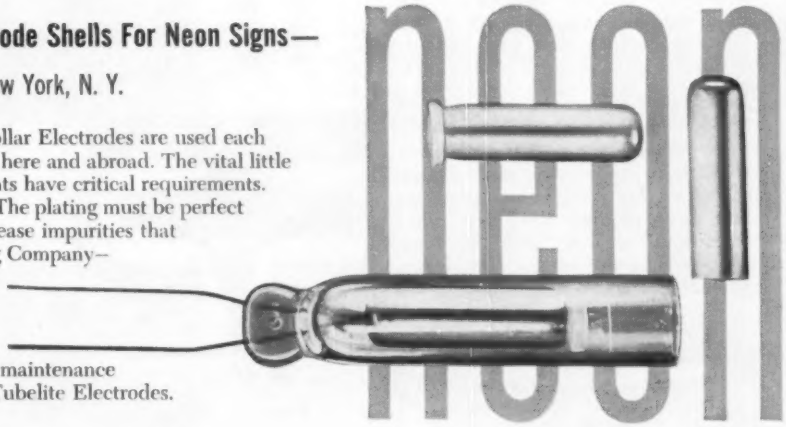
Fox Products Company, Philadelphia, Pa.

The Constant Level Water Valve, made by Fox Products, automatically keeps fresh water available in poultry house troughs to help stimulate maximum growth and egg production. It also protects the health of chickens by shutting off water supply when hens accidentally tip the water trough over. Fox first tried a plastic nozzle on the valve—found it unsatisfactory. Red Brass was a natural for resisting corrosion of the air-water mixture in the nozzle. Instead of tooling up for this part, however, Fox Products found it more economical to have the nozzle made by The American Brass Company.

Nickel-Plated Armco Iron Electrode Shells For Neon Signs—

Tube Light Engineering Company, New York, N. Y.

Millions of these Tubelite Ceramic Collar Electrodes are used each year to keep neon signs glowing, both here and abroad. The vital little nickel-plated iron electrode components have critical requirements. Close tolerances must be maintained. The plating must be perfect—porosity and uneven plating can release impurities that darken tubes. Tube Light Engineering Company—leading manufacturer and distributor of neon tube supplies—turned to the specialized facilities offered by The American Brass Company for both forming and plating, to simplify maintenance of quality standards set up for their Tubelite Electrodes.



The American Brass Company has specialized equipment, such as high-speed multiple-plunger presses, for the economical production of parts like these for industry. It has the experience and skill to design tools which reduce the number of operations and lower production costs—techniques developed over a century of service to manufacturers.

YOUR CHOICE OF METAL: Parts like these can be furnished in copper, brass, bronze, nickel silver, nickel, iron, stainless steel, steel, and aluminum—in a wide variety of finishes.

FOR AN ESTIMATE: Just send a sample, drawing, or description, together with quantity and other pertinent information. Address: The American Brass Company, Waterbury Brass Goods Division, Waterbury 20, Conn. 5668

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long after they're written off

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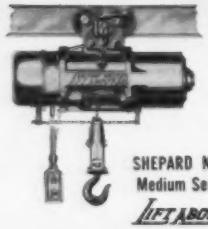
Investigate the complete line of Shepard Niles Hoists . . . choose from medium and heavy capacities with slow, medium or fast speeds. Built for cycle duty, heavy intermittent duty, medium duty and light-occasional service. Short to long lifts, standard or close headroom, manual or magnetic controls.



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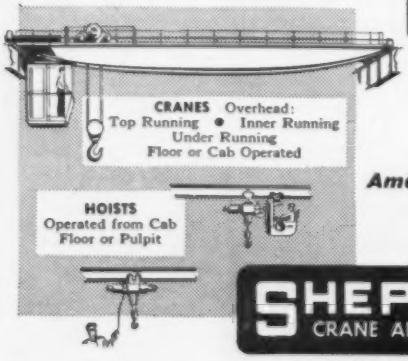
LIFTABOUT Jr.

Heavy Duty
SHEPARD NILES
Hoist



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"These magnets are at least 10 times better . . ."

on a laboratory scale, a new, highly magnetic form of manganese-bismuth. Furthermore, the new process produces this new magnetic material directly, and in a high state of purity."

Supported by Air Force

Dr. Zener said the new process originated with Dr. A. J. Cornish in the magnetics and solid state physics department of the Westinghouse Research Laboratories. Improvements in the original technique, and investigation of permanent magnets made from the new magnetic material, are now under way at the Westinghouse materials engineering department. This work, Dr. Zener said, was initially supported by the U. S. Air Force's Air Research and Development Command, Wright Air Development Center, Dayton, Ohio.

"Perhaps the greatest advantage of MnBi magnets is their unusual resistance to demagnetization," Dr. Zener said. "These magnets are at least 10 times better in this respect than most commercial magnets available today."

The research executive explained that magnets of manganese-bismuth derive many of their unusual properties from being powder-type magnets. Each individual MnBi particle, about 40 millionths of an in. diam, is itself a tiny magnet.

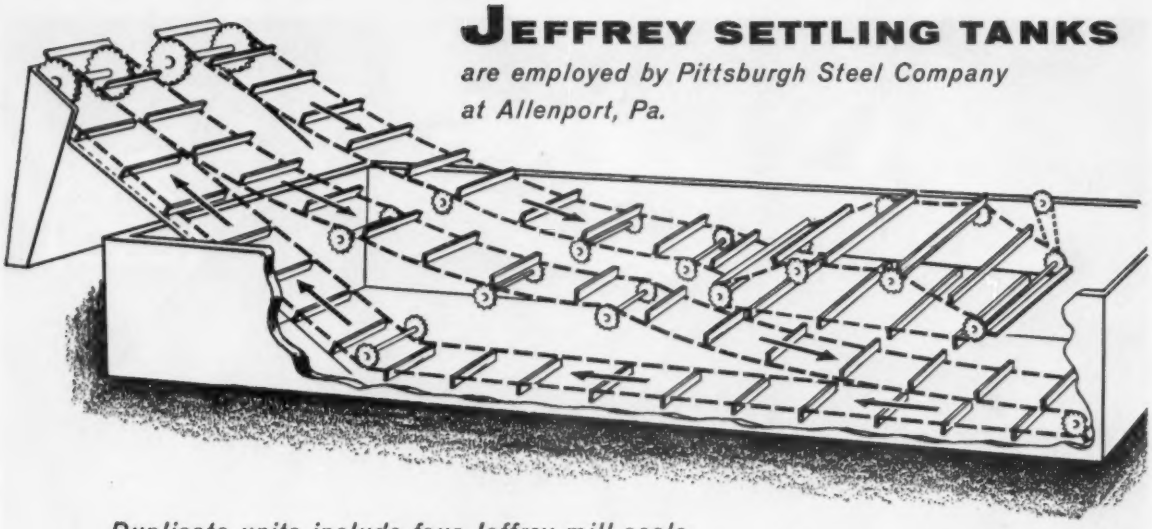
Materials:

Pre-fab rounded corners solve production headache

When product design calls for round corners on your weldments do you find getting them a production headache? Does the need to provide heavy, expensive press equipment not regularly in use influence your decisions against incorporating corners? Do requirements for close-fitting corners, without buckling or warping, limit your shop activity in this area?

If so, don't be discouraged. Help is on the way.

Prefabricated spherical corners, described as fitting as closely as an "orange peel does an orange," have been developed.

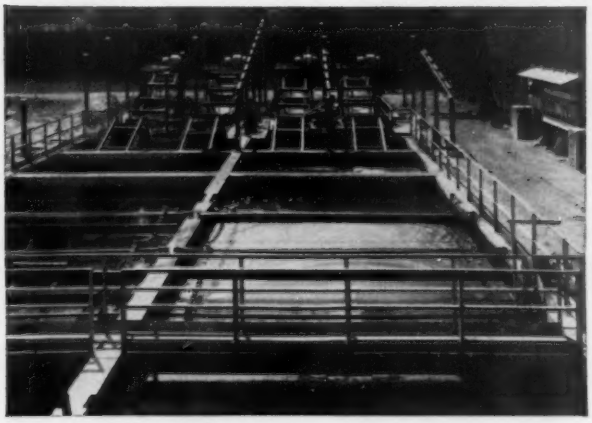


JEFFREY SETTLING TANKS

are employed by Pittsburgh Steel Company at Allenport, Pa.

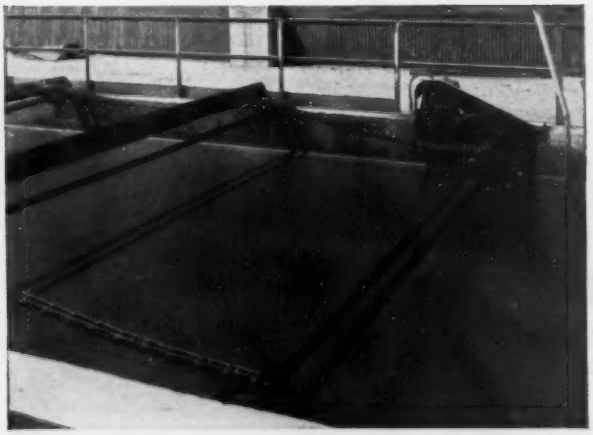
Duplicate units include four Jeffrey mill scale collectors and two Jeffrey scum skimmers

Water borrowed from the river is cleaned before its return



Above: Jeffrey mill scale collectors.

Below: Jeffrey scum skimmers.



WATER DISCHARGED to the Monongahela River, after passing through this Jeffrey clarification system, fully meets the State of Pennsylvania's anti-pollution requirements.

Solids and grease content are low after treatment . . . as little as 2.5 parts per million of grease remain after passing through the scum skimmers.

At this plant, water is plentiful, so Jeffrey's assignment was to prevent stream pollution. In other industrial areas water may be scarce, so Jeffrey equipment cleans it for repeated use. Valuable mill scale is recovered, too.

Whatever your water treatment problem—stream pollution, recovery of valuable solids, water conservation—turn it over to Jeffrey sanitation engineers. They'll help you plan a system to meet your requirements. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
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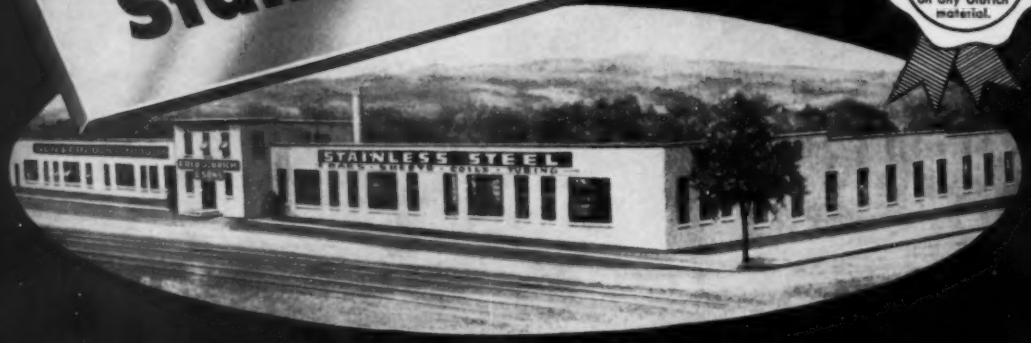
ULBRICH Stainless Steels

Certified ANALYSIS can be given on any Ulbrich material.



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STRIP • Flat Wire and other Stainless Steels
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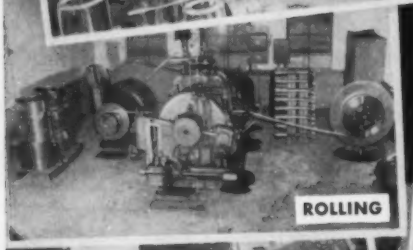
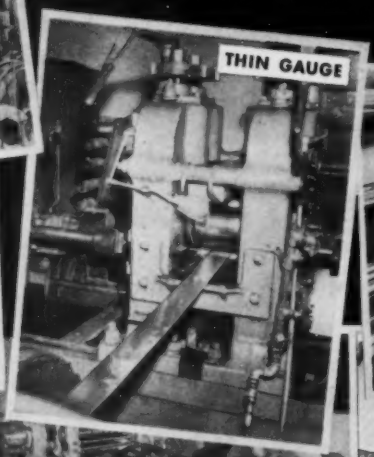
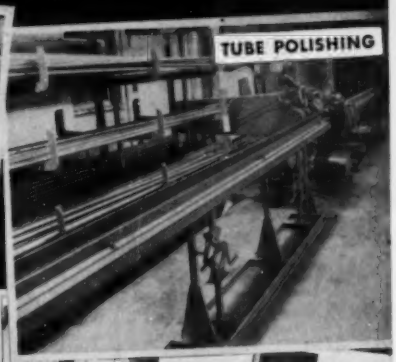
exactly as you want it!
Inquiries for small lots welcomed.







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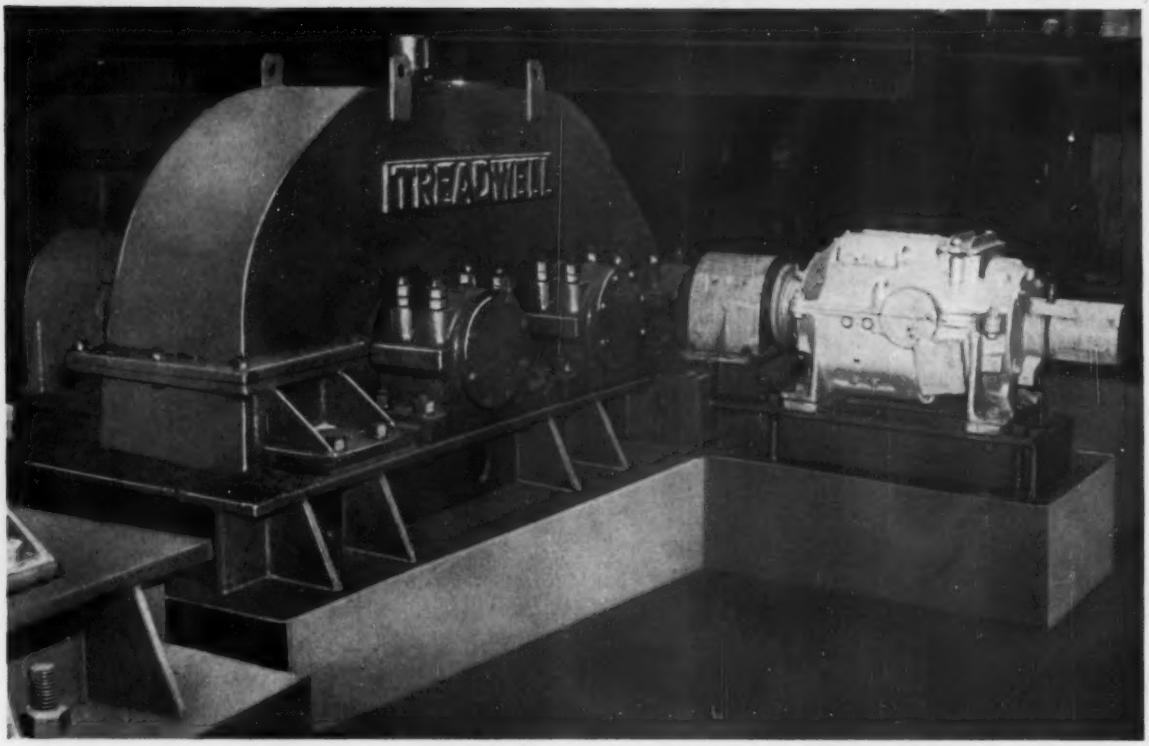

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These units are built with single, double, or triple reduction, depending on the special requirements of horsepower and speeds.

They are furnished with single helical or herringbone gears and plain or antifriction bearings according to customers specifications. Gear housings will be welded steel construction or steel casting as desired.

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Mills, Sheet
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Tables, Mill

Tables, Tilting & Lift
Tables, Transfer
Transfers

Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.

Beds, Cooling
Beds, Inspection
Bumpers, Furnace
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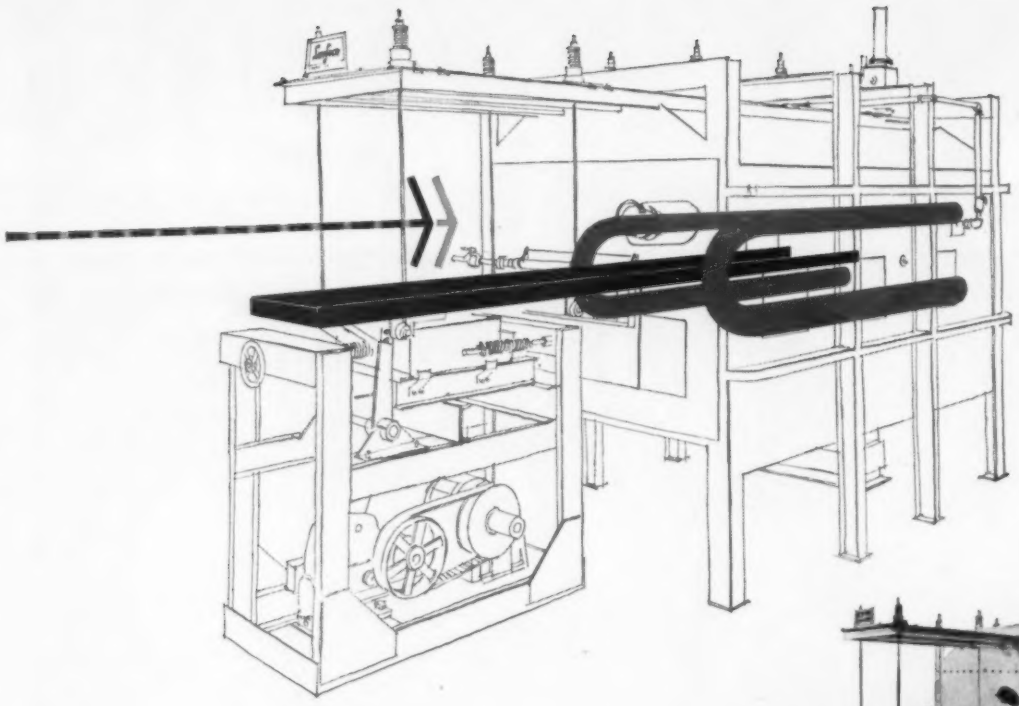
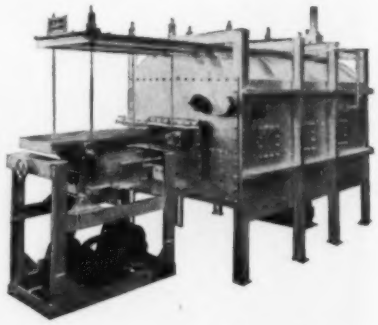




New furnace puts "snap" in small parts production

The quantity and quality of small parts can be increased by controlled atmosphere heating and quenching in this new Surface® Snap Hearth Furnace. Production rates up to 300 lbs/hr are being attained in many plants.

This is the first suspended hearth furnace to use suction type radiant tube firing, which eliminates a muffle and its replacement problems. Another important feature is the hearth, which snaps to move the parts a short distance at regulated intervals. Hopper loading can be easily applied to the furnace.

Combined with Surface atmosphere generating equipment, the Snap Hearth Furnace is especially efficient for clean hardening, dry cyaniding, carbon restoration. In several plants, the furnace is part of completely automatic hardening-tempering lines.

Snap up your small parts production; ask your Surface man to show you how the Snap Hearth Furnace fits your plant.

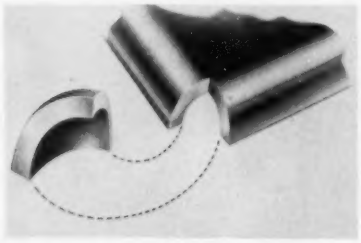
SEND FOR BULLETIN SC-173 • SURFACE COMBUSTION CORPORATION • 2373 DORR ST., TOLEDO, 1, OHIO

Surface® Heat Treat, Steel Mill, Glass Divisions • Kathabar® Air Conditioning Division
Janitrol® Heating and Air Conditioning Division • Janitrol® Aircraft-Automotive Division

Surface®
HEAT TREATING EQUIPMENT

With their use, it's possible to get uniform, round corners in weldments such as tools, frames, housings, panels, fixtures and machine bases by simply notching and bending the four edges of a plate to the standard radius of the prefab corner. Then the corner is affixed and welded into place.

The corners, developed and manufactured by Conner Steel Products,



Ready made corners offer close fit and better appearance.

Detroit, are made of 1020 steel. They are available in thicknesses from ⅛ in. to ½ in. Inside radii of the units range from 1 in. to 2½ in. with outside radii from 1⅛ in. to 3 in.

By eliminating troublesome, costly forming methods and making possible standardized, uniform "ball" corners they may have a significant effect on the design of many products where corners are a problem.

Air Pollution:

Catalytic purifier rids lifts of gas fumes

C. V. Hill & Co., Inc., Trenton, N. J., operates 14 gasoline-powered fork lift trucks inside its plant and warehouse with no exhaust fumes or smoke.

Mufflers on the trucks have been replaced with a catalytic device converting more than 95 pct of noxious carbon monoxide, hydrocarbons and odor-producing elements from the exhaust into harmless water and carbon dioxide.

The device is a product of Oxy-Catalyst, Inc., Wayne, Pa., developer of fume elimination equipment for industrial processes and internal combustion engines.

Equipment:

Calculator so simple child can use it

So simple a child can operate it, says the manufacturer of this simple to operate calculator. We'll bet you've heard that one before. However, this one has been field-tested by a 9-year-old girl and her 11-year-old brother.

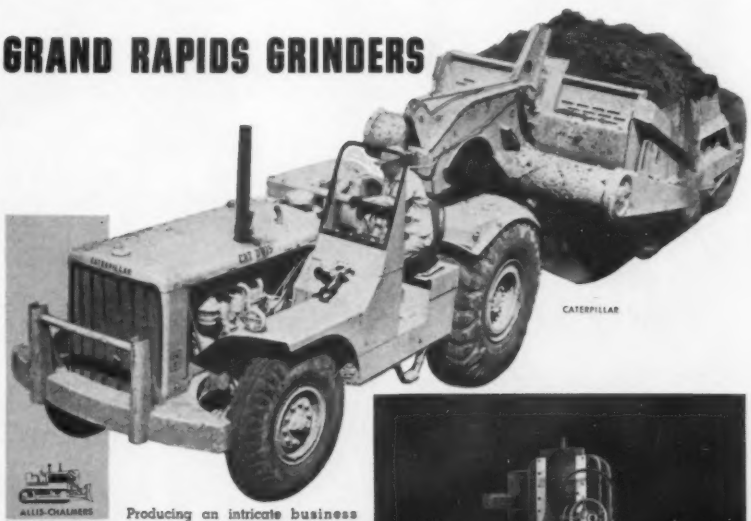
Fourth grade student Nancy Wolf and brother Michael, of the sixth grade, put on a show for the Office Machine Dealers in Chicago recently of Utility Suppy Co.'s nationally marketed calculator.

For Use By Engineers

Using the device, advertised by the company for use by "businessmen, engineers and scientists," the two children put on an amazing

FOUND WHERE WORLD FAMOUS TRACTORS ARE "BORN"

GRAND RAPIDS GRINDERS



Producing an intricate business machine requires exceptional toolroom precision. That's why these manufacturers use Grand Rapids Grinders . . . engineered to achieve extraordinary grinding precision at cost-cutting speed.

Model No. 55, at right, offers such features as one-piece column and base for permanent, vibrationless alignment, wheel head with powered rapid vertical travel, hydraulically actuated cross feed and longitudinal travel table. And it's the fastest grinder of its size and type, with a variable table speed up to 125 fpm!

Whether you make business machines or bulldozers, you can count on Grand Rapids Grinders for maximum toolroom precision.

GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER. Table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head is 16". Preloaded ball bearing spindle greased for life. Spindle speed 1925 and 2500 rpm.

GALLMEYER & LIVINGSTON

Write for full information.

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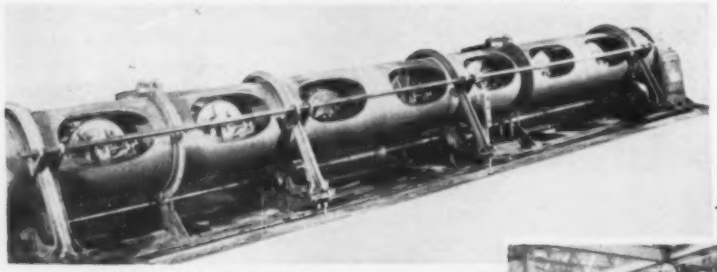
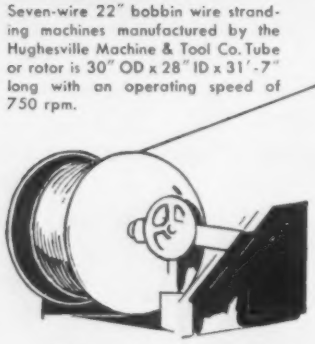
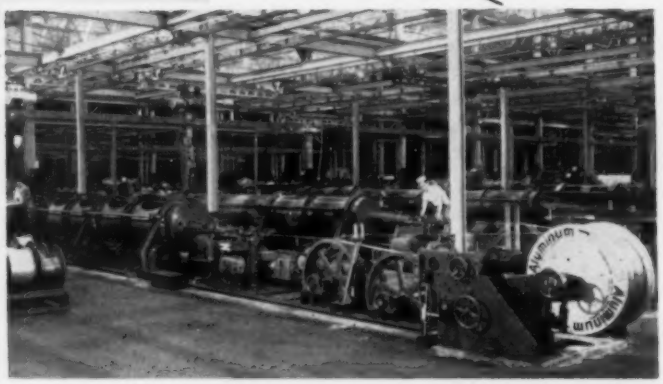
In the Wire-Stranding Industry...



Seven-wire 22″ bobbin wire stranding machines manufactured by the Hughesville Machine & Tool Co. Tube or rotor is 30″ OD x 28″ ID x 31′-7″ long with an operating speed of 750 rpm.





Higher Speed-Higher Production- through ACIPCO *centrifugally spun* STEEL TUBES

Wire stranding machines manufactured by the Hughesville Machine & Tool Co. are the standard of the industry. Acipco centrifugally spun steel tubes are the standard at Hughesville. They say: "We stress the use of your tubes in the manufacture of our stranding machines."

Why? Their answer: "Higher speeds and production have been obtained in the wire stranding and cabling industries through the use of centrifugally spun steel strander tubes. These higher speeds are obtained due to the fact that centrifugally spun tubes maintain their dimensional and rotational stability for many years, even though many large openings are cut in the tubes for lowering bobbins of wire inside the tube."

If your tubular applications require quality tubes, inherently stable, durable, and easier to machine, investigate Acipco's complete production facilities. You will find that Acipco tubes, supplied to your exact physical and metallurgical specifications, can mean lower costs and higher production for you.

Acipco tubes now serve manufacturers of equipment for the aircraft, chemical, paper, petroleum, steel, textile, and other industries.

SIZE RANGE: Lengths up to 16′ — longer lengths by welding tubes together. OD's from 2.25″ to 50″; wall thicknesses from .25″ to 4″.

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

FURNISHED: As cast, rough machined, or finish machined, including honing.

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Special Products Division
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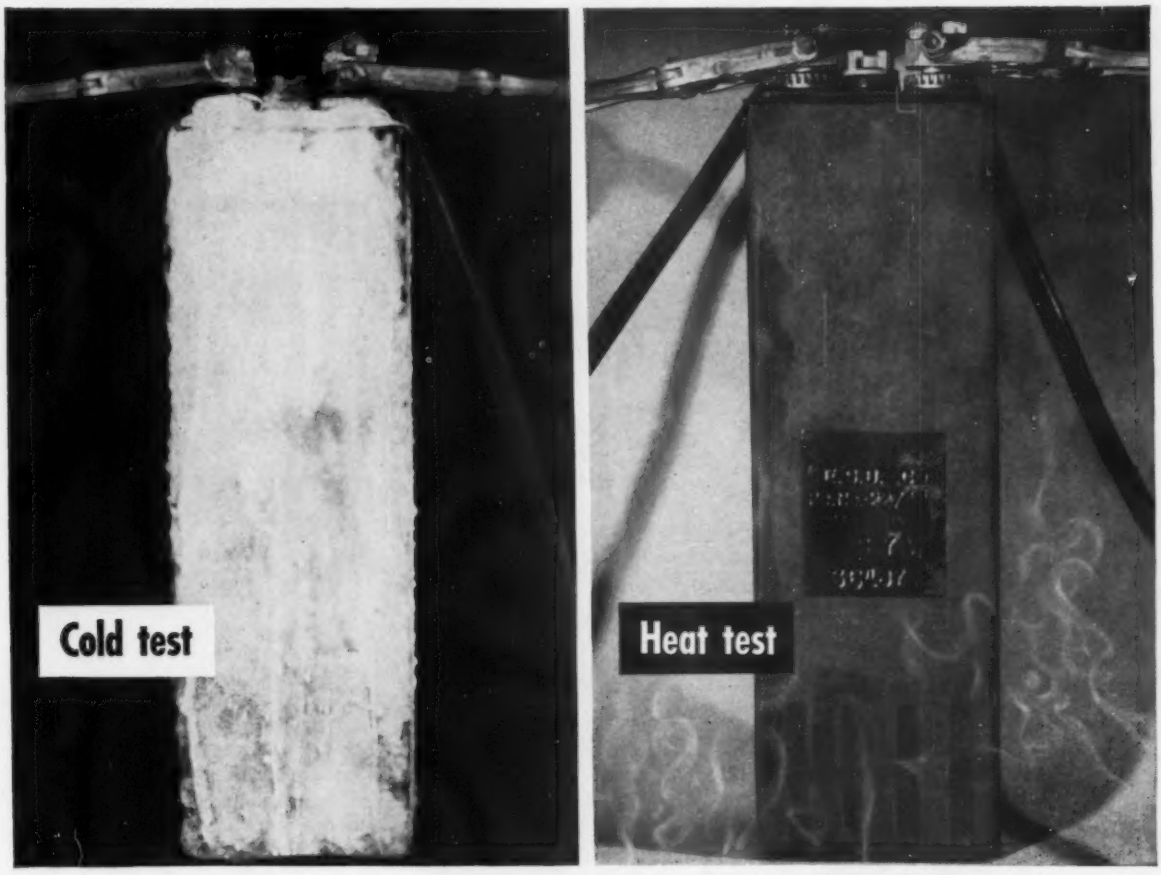
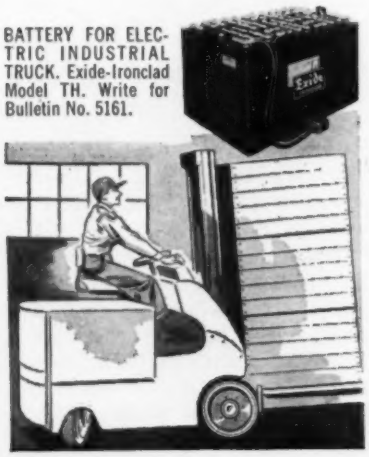
EXIDE-IRONCLAD BATTERIES

For electric industrial truck operation



Deliver the power over a wide range of temperatures



BATTERY FOR ELECTRIC INDUSTRIAL TRUCK. Exide-Ironclad Model TH. Write for Bulletin No. 5161.

At few places on earth do storage batteries ever encounter such extremes of cold and heat as are used to test Exide-Ironclad Batteries in the laboratory.

These tests prove that Exide-Ironclad Batteries can be depended upon over a wider range of temperatures than they are ever likely to be asked to endure. And they provide tangible extra assurance of dependability at all the more normal operating temperatures.

Extreme temperature performance is especially important when a battery must have continuous dependability. It is often at these extremes that a battery is most needed. And a battery cannot be called dependable unless it can be counted on every day—all of the time.

The high and low temperature performance of Exide-Ironclad Batteries is a direct result of their unique construction features and special engineering. In countless applications, these batteries have earned an unmatched reputation for long life and high capacity. When you need batteries for heavy duty uses, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

display of calculating feats. From numbers called from the audience including figures running into the billions, short-cut multiplication, squares, cubes, percentages, division of large numbers, square roots and the solving of equations, the children quickly presented the answers. Climaxing the demonstration, little Nancy did a large-figured multiplication problem — blindfolded.

Are these children some sort of geniuses? Not so, says Marvin Wolf, their father and Utility Supply vice-president. He assures everyone that they just make average grades in school. The uniqueness of the calculator lies in the fact that it performs calculations in much the same manner as large desk calculators, yet is small enough to be carried in one's pocket or brief case.

Closeup view of the calculator "Even a child can operate."

Chemicals:

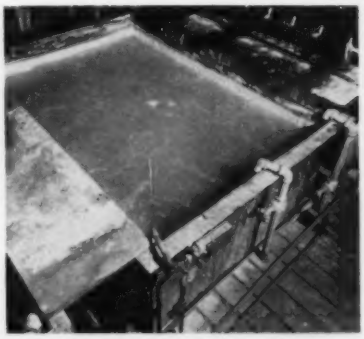
System stirs solutions instead of trouble

Reynolds Metals Co. uses air pressure at its Louisville, Ky., plant to stir caustic solutions and similar chemicals. The solutions are agitated in steel tanks approximately 7 ft deep by introducing compressed air at a pressure of around 10 psi through perforated pipelines near the bottom of each tank. The resulting bubbling keeps the liquids well stirred.

Air is supplied by an axial-flow blower rated at 900 cfm. This blower, manufactured by the Read Standard Corp., York, Pa., was installed in 1951 and has been working two shifts per day practically all the while since that date.

Air Discharged From Pockets

Air is taken in and discharged from the pockets that form between intermeshing male and female rotors during the cycle of rotation.



Air pressure in this tank stirs caustic solutions.

The two rotors operate with a clearance of a few thousandths of an in. but actually never touch; hence there is no friction wear nor any need for internal lubrication to contaminate the air stream. Blower has a center-to-center distance between rotors of 9 in., and the rotors are 16 in. long. Blower is driven at 1400 rpm by V-belt from a 75 hp electric motor, providing ample reserve power for increasing the pressure or the capacity.

Fastening:

Roller washers are made of nylon

New rolled washers, made from DuPont's "Zytel" nylon, are being manufactured by Nyltite Corp. of America, Union, N. J.

Washers are slipped over the bolt, screw, rivet or nail and when pressure is applied to tighten the fastener, the rolled washer "cold-flows" around the fastening device and under the fastener head. The product's hugging qualities fill all space between threads and hole.

Another of the Reasons Behind Brad Foote Quality—

TOOTH SPACING

• 99% of gear drawings do not specify tooth spacing. For most applications, industry generally believes that competent gear manufacturers, working by standard AGMA practices, will produce gears within the limitations required for easy assembly and good load transmission.

• Occasionally, however, on very precise jobs you may find it necessary to specify extreme accuracy of tooth spacing and nonadjacent tooth spacing. Applications such as radar mounts, timing mechanisms, indexing mechanisms—all may require closer tooth spacing tolerances than are obtainable with average equipment in the hands of regular gear manufacturers.

• BRAD FOOTE welcomes precision jobs like these. We can add to highly specialized equipment specific experience in meeting this, as well as many other demanding requirements for special gear production.

• Prove to yourselves the savings that BRAD FOOTE quality can mean. Let us quote on the gear requirements for your next program.

BRAD FOOTE MAKES ALL TYPES OF GEARS—IN A COMPLETE RANGE OF STYLES AND SIZES

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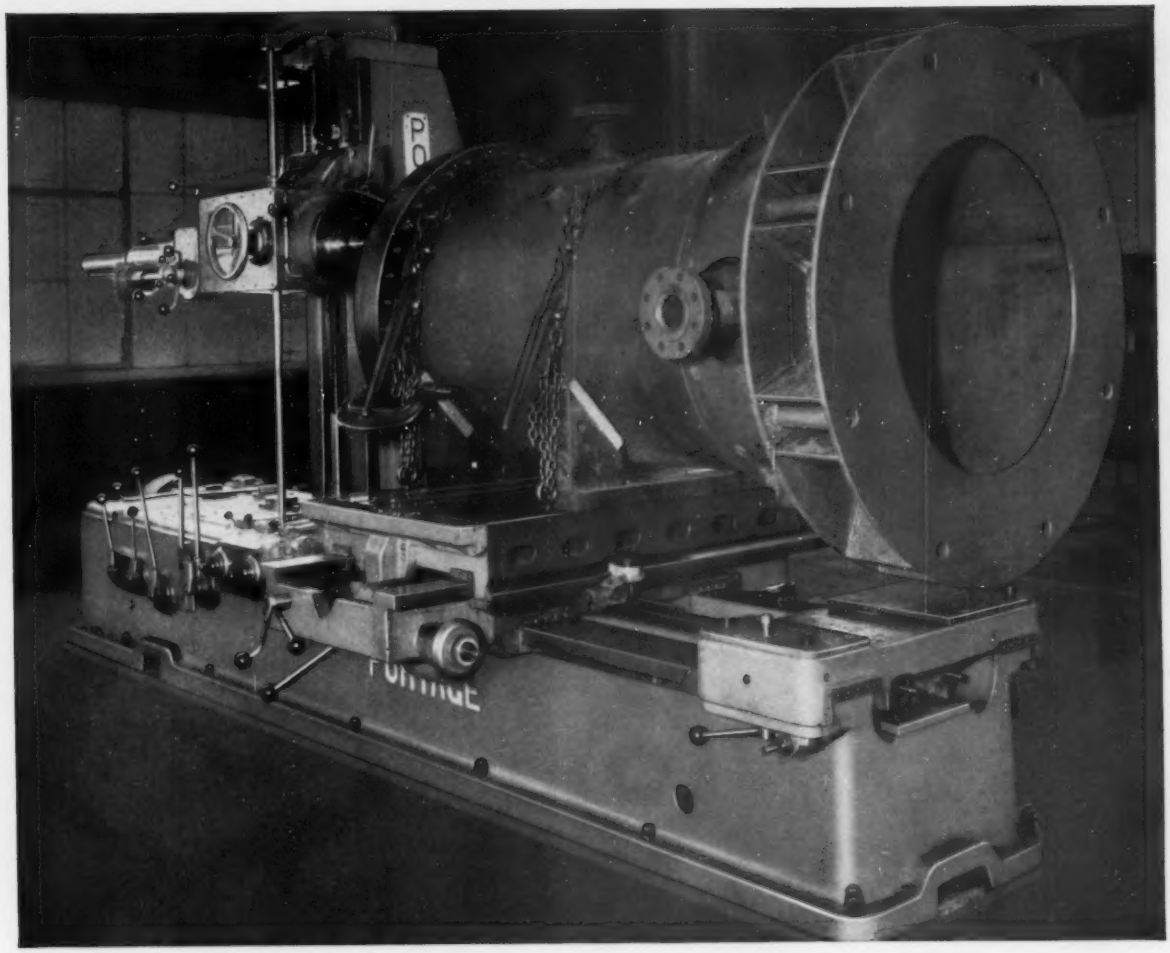


Photograph courtesy of Western Supply Company, Tulsa, Oklahoma

Read what this man has to say about PORTAGE MILLS!

Mr. D. W. Brady, Plant Manager of Western Supply Company, Tulsa, Oklahoma says,

"Our manufacturing facilities here at Western are devoted almost entirely to heat exchanger production. We have found the versatility of the Portage Mills allows us to do a wide variety of machining operations required in the fabrication of this type of work. We have found the machine to be very reliable and have experienced no lost time for repairs since it was installed."

Mr. Brady's kind remarks are typical of those coming in from across the country ... PORTAGE MILLS are truly the *machine of the year* ... and remember ... Portage costs less to buy. Write for the illustrated catalog ... and ask for a proposal too!

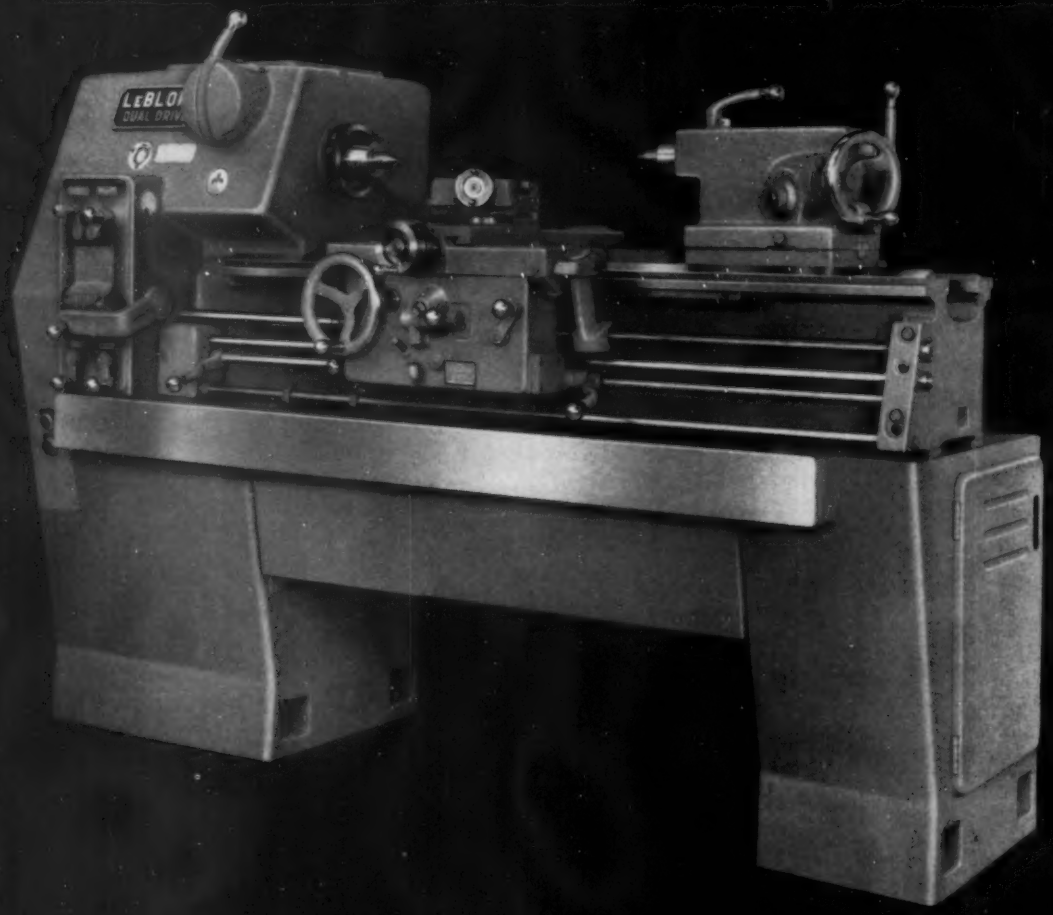
THE Portage MACHINE CO.

1035 Sweitzer Avenue • Akron 11, Ohio

Representatives in Principal Cities

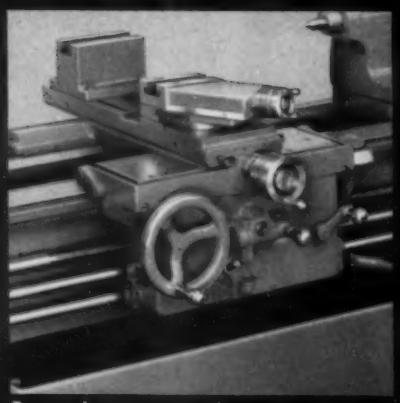
BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916

a LeBlond Dual Drive costs



gives you more than higher priced lathes

Totally-enclosed quick change box is automatically lubricated, provides 48 feed and thread changes.



Rugged apron and carriage gives long-lived precision. Shown with compound and plain connected rest.

Hydra-Trace® makes the Dual Drive the least expensive tracing engine lathe of comparable quality.

only $4625*

More useful power, more swing capacity — plus all the precision, convenience and long life that LeBlond knows best how to put into a lathe! Briefly, this is why the Dual Drive is considered the best buy for medium duty turning by companies who want the most productive capacity per dollar invested.

Virtually all of the 5 hp is available for cutting due to headstock design which uses both gear and non-slip belt ranges. Sixteen speeds from 31 to 2400 rpm are chosen by a single lever.

Swing over bed and carriage wings is 15", over compound, 9½". A single lever controls both cross and length feed. Quick change box is totally-enclosed, provides 48 feed and thread changes. Tailstock is of the thrust-lock design. Hardened and ground steel ways are arranged according to the compensating principle which distributes cutting forces for maximum life and precision.

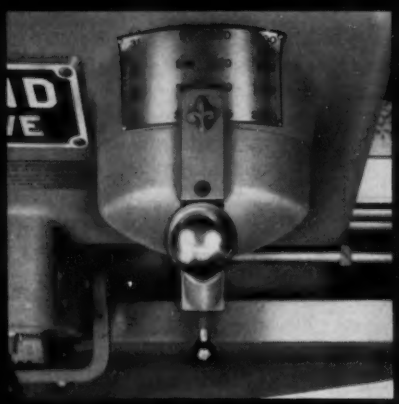
For specialized turning, a variety of attachments are available. The addition of Hydra-Trace,* for example, makes Dual Drive the least expensive tracing lathe you can buy of comparable capacity and quality.

Whatever your turning needs, there's a lathe in LeBlond's complete line to do the job. 76 different models to choose from. Call your LeBlond Distributor or write for complete information about the Dual Drive, Bulletin 6C.

* Base price, 30" center distance with standard equipment, not including motor or control.

*Hydra-Trace (Trade Mark registered U. S. Pat. Off.) is LeBlond's heavy-duty hydraulic tracing attachment. Can be mounted in place of compound rest on practically all LeBlond lathes built since 1935.

. . .



Single lever selects sixteen speeds from 31 to 2400 rpm in both gear and non-slip belt ranges.

. . . cut with confidence

LeBLOND of Cincinnati

THE R. K. LEBLOND MACHINE TOOL COMPANY
CINCINNATI 8, OHIO

World's largest builder of a complete line of lathes for more than 69 years

MATERIALS: Softest Solid Rubber Announced

Super-soft and firm, rubber can be bonded to metal or other material . . . Can be vulcanized . . . Withstands heat to 200°F and is considered good electrical insulator . . . Said thought to be softest, solid rubber yet developed.

Development of a new super-soft, non-porous rubber that can be securely bonded to metal has been announced. Roth Rubber Co. of Chicago believes this to be the softest, solid rubber as yet developed. It has a softness characteristic of 5 durometer, can be used in temperatures up to 200°F. It is a reasonably good electrical insulator and can be vulcanized or bonded to metal and other materials.

Not A Sponge

There are many places in industry where this super-soft, non-porous, solid rubber (it is not a sponge) can be used: to absorb vibration, dampen sound, or as an air-tight or water tight gasket. Roth makes this rubber in sheets or strips up to one in. thick. Company can mold or bond it to metal or other odd shapes.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 89. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

One company is bonding it to a flexible, metal sieve conveyor belt. Here rubber is used as a water tight seal.

It looks, feels and is rubber, but it is super soft.

Engineers believe there are uses for this super-soft rubber in various types of machines used in metal industries to absorb vibration, dampen noise, in place of a sponge material, as an air-tight seal, shock mount, water-tight seal or as an insulator.

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Maintenance:

Factory-sealed grease is like caulking gun

Similar to those long used in caulking guns, a new type grease gun that uses factory-sealed grease cartridges is offering something new in the way of lubrication.

System's advantages are said to be many, especially for those now using hand guns. A major gain is time saved in greasing preparation. It takes about a minute to insert the new type cartridge in the gun. Anyone can do it without getting a single smear of grease anywhere, according to H. D. Simon, Tower Oil Co. vice-presi-

dent. In contrast, the messy job of hand filling generally takes more than ten minutes, he says.

An additional weakness of hand filling is grease waste. "It has been found that approximately ten pct of all grease in containers is never used," says Simon. "This is lost by the greaser in wiping excess off the outside of the gun and off his hands after loading, and that which clings to the side and bottom of the pail, keg, or drum."

Another liability of hand filling is the risk of contamination that is always involved in handling. "Open containers draw dirt," he adds, "and dirty grease should be thrown out. But sometimes the dirty grease is used with the attendant danger of causing mechanical failure."

Still another disadvantage of hand filling guns is described as time wasted when gun is pumped dry far from "headquarters room."

Grease cartridge gun is handled same as chalking gun.

When gun is empty, greaser must return to refill it. This round trip walking time varies according to the plant. Inefficiency such as this is estimated by Simon at five to ten minutes. In contrast, greaser can carry spare cartridges with him to refill "on the spot."

One large foundry tells about greasing overhead cranes. Often the gun ran out while mechanic was in the middle of his grease job. Aside from having to climb down to the floor level, he had to walk a full block to reach his grease drum.

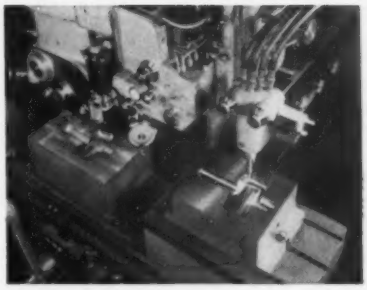
year after year

BIGGEST IN VOLUME SALES

for tough die sinking!

Raise the Feed...
Reduce Die Costs with

T-J CUTTERS



T-J Cutter at work on a Cincinnati 16" Vertical Hydrotel, latest design Die Sinker.

Whether you have new machines or older types in your die and forge shop, you'll be ahead in *accuracy and production* with T-J Die Sinking Milling Cutters! T-J Cutters are *extra sturdy* . . . reduce die costs . . . preferred everywhere!

Designed for speed, accuracy and long life . . . less breakage . . . more work between grinds! Made from an extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. Wide range of styles and sizes. Send for new catalog No. 1055. The Tomkins-Johnson Co., Jackson, Mich.

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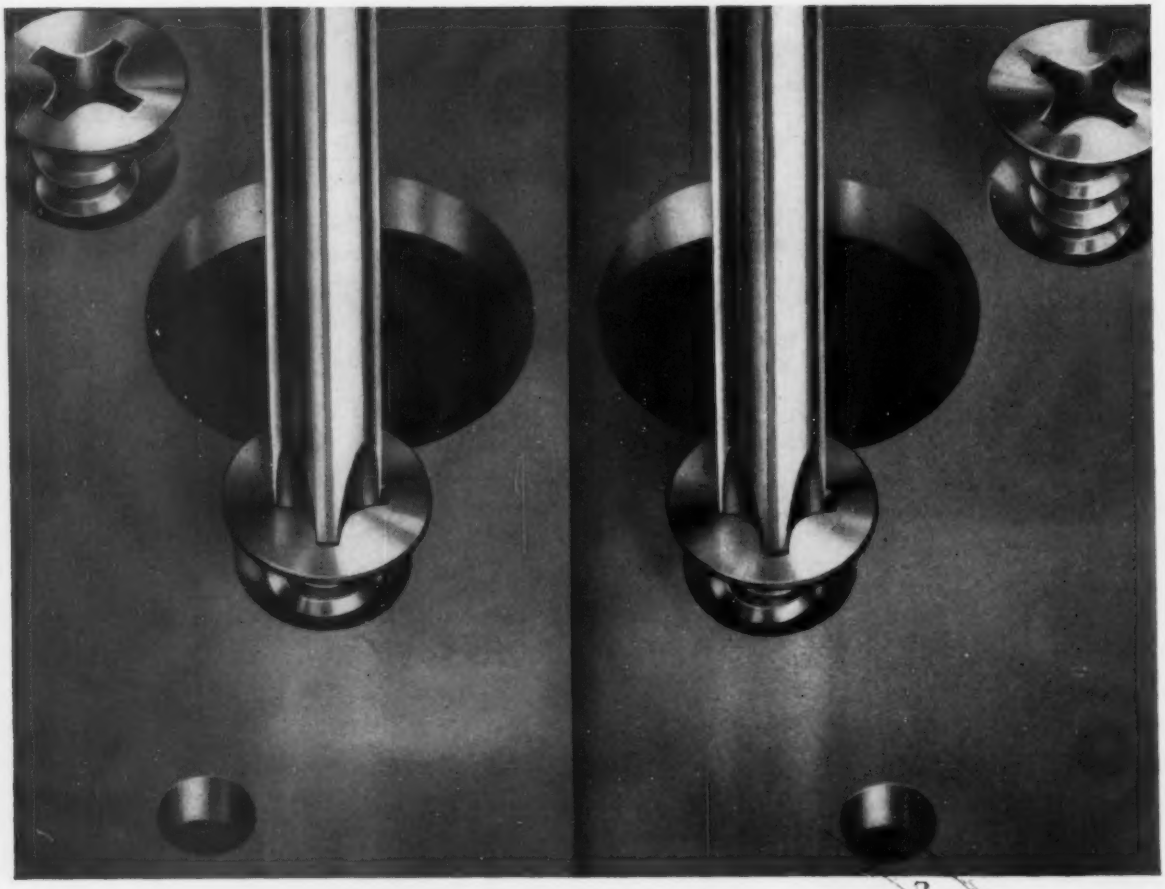
39 Years Experience



They may Look the same but...

American is the name!

Your true cost of modern fasteners consists of four factors:

1. price **3. quality**
2. service **4. research**

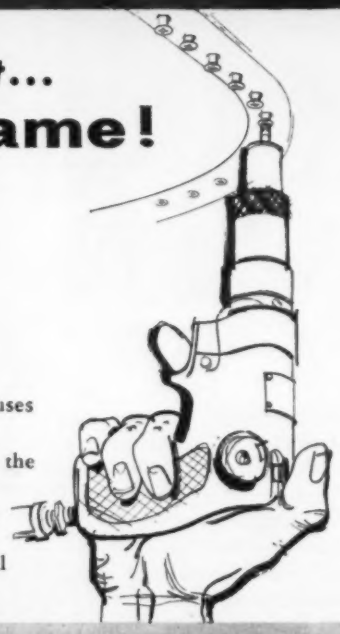
Sometimes there are local price differentials for the moment. But no one gives you more of all four than American.

American Gives You More of All Four

. . . *in service*, where American's controlled servicing meets any production schedule . . . a furniture manufacturer, for instance, uses more than 7 million American Phillips fasteners a year.

. . . *in quality*, where American's quality standards are highest in the industry to assure conformance of every product run.

. . . *in research* that has developed not only the original Phillips Head fastener but saved an aircraft manufacturer substantial sums by showing him how to change from a costly stainless steel fastener machined from bar stock to a sturdy cold-headed unit.



If this sounds unique in the industry, it is. For nowhere will you find more of the four basic features you want than from American Screw Company — price, service, quality, research.

Make your own comparisons . . . send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!

AMERICAN SCREW CO. • WILLIMANTIC, CONN.
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ANOTHER NEW HOUGHTON DEVELOPMENT IN PACKING DESIGN

HOMOGENEOUS RUBBER | FABRICATED RUBBER | LEATHER

STANDARD STACK HEIGHT
for "V" Packings

Good news for the designer! This new packing development standardizes the stack height of *all* Houghton "V" packings. Simply determine the number of packings needed in the gland (according to your pressure requirements) . . . then allow for the specified dimension in your drawing. Whether you use homogeneous rubber, fabricated rubber or leather "V's" . . . they'll fit!

You can forget "special" dimensions set up by various packing manufacturers for particular types of packings. Standardize on stack height with packings from Houghton and you'll save time and money from the drawing board on!

The leadership in hydraulic know-how is typical of Houghton, which supplies all types of hydraulic and pneumatic packings, as well as a complete line of hydraulic oils and fluids.

Standardize on Houghton. You'll get the newest first—and the best always. Call your Houghton Man and let him explain Houghton's Hydraulic Service. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

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Ready to give you on-the-job service . . .

It figures

✓ FASTER MACHINING
✓ LONGER TOOL LIFE
✓ FINER FINISH
✓ QUALITY CONTROLLED

MORE PRODUCTION!
MORE PROFIT PER UNIT!

COLD FINISHED STEEL

Controlled CARBON and ALLOY

WYCKOFF
COLD FINISHED STEEL

Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Wide Flats up to 14"
All types of furnace treated Steels

SPECIALISTS IN COLD FINISHED STEELS EXCLUSIVELY

WYCKOFF STEEL COMPANY
GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.
Branch Offices in Principal Cities
Works: Ambridge, Pa.—Chicago, Ill., Newark, N.J.—Putnam, Conn.

Plating:

Chromium plating additive unveiled

Representing what is considered America's first commercially successful chromium plating additive developed by a basic chromic acid producer, this new catalyst is designed for both decorative and hard-chrome plating applications.

It's makers, Chromium Chemicals Div. of Diamond Alkali Co., say it is the result of more than two years' continuous, intensive engineering exploration and applied research. It has been thoroughly tested in a number of plants and shops across the country.

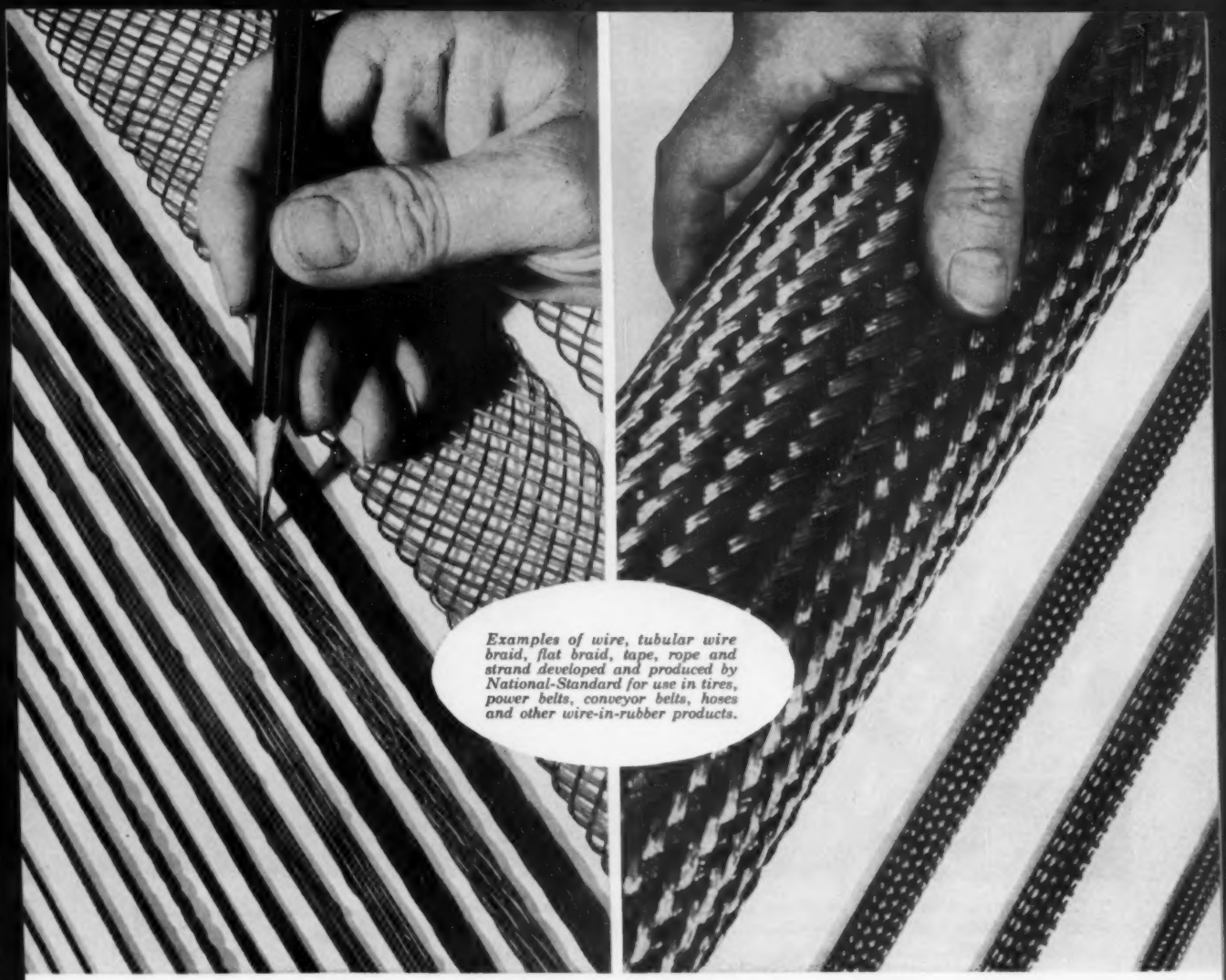
Speeds-Up Operations

In replacing a portion of the sulfate used in conventional chrome-plating solutions, the new product is reported to speed-up and simplify chromium-plating operations. The material, consumed only through drag-out, is said to provide a number of advantages.

Sample pieces show results of new chrome plating additive.

Principal benefits provided by the use of this new additive, the manufacturer says, include faster plating, broader operating range of plating solution, and greater covering power. It is also claimed to make possible the electrodeposition of brighter and harder chrome coatings, to simplify anoding in hard-chrome applications, and to improve the metallurgical characteristics of chromium plate.

Faster chromium plating is achieved, it is said, through an increase in cathode current efficiency and the use of higher current densities. Bright deposits are obtained over a broad temperature range.



Examples of wire, tubular wire braid, flat braid, tape, rope and strand developed and produced by National-Standard for use in tires, power belts, conveyor belts, hoses and other wire-in-rubber products.

How product "X" might be improved

● Whatever you make, from cheese slicers to electronic brains, chances are wire of some kind in some form enters into your product make-up. Maybe it isn't special wire. Maybe it should be! In either case it is in this area that National-Standard service might help you produce a better product at lower cost.

For example, National-Standard has long devoted large scale research and engineering to improving the teamwork of wire and rubber—extensive work on wire fabrication, material, finish, corrosion, strength, elongation, adhesion and other factors that affect the behavior and cost of wire-in-rubber products.

You can draw on the fruits of all this and similar work performed for many other industries on the most effective use of wire.

So if you even suspect that a different or specially developed type of wire might improve your product or speed production, don't hesitate. Consult with National-Standard. We make a point of such service . . . want to be of help . . . and are geared to do it well, without obligation. Check with us now . . . or any time!

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

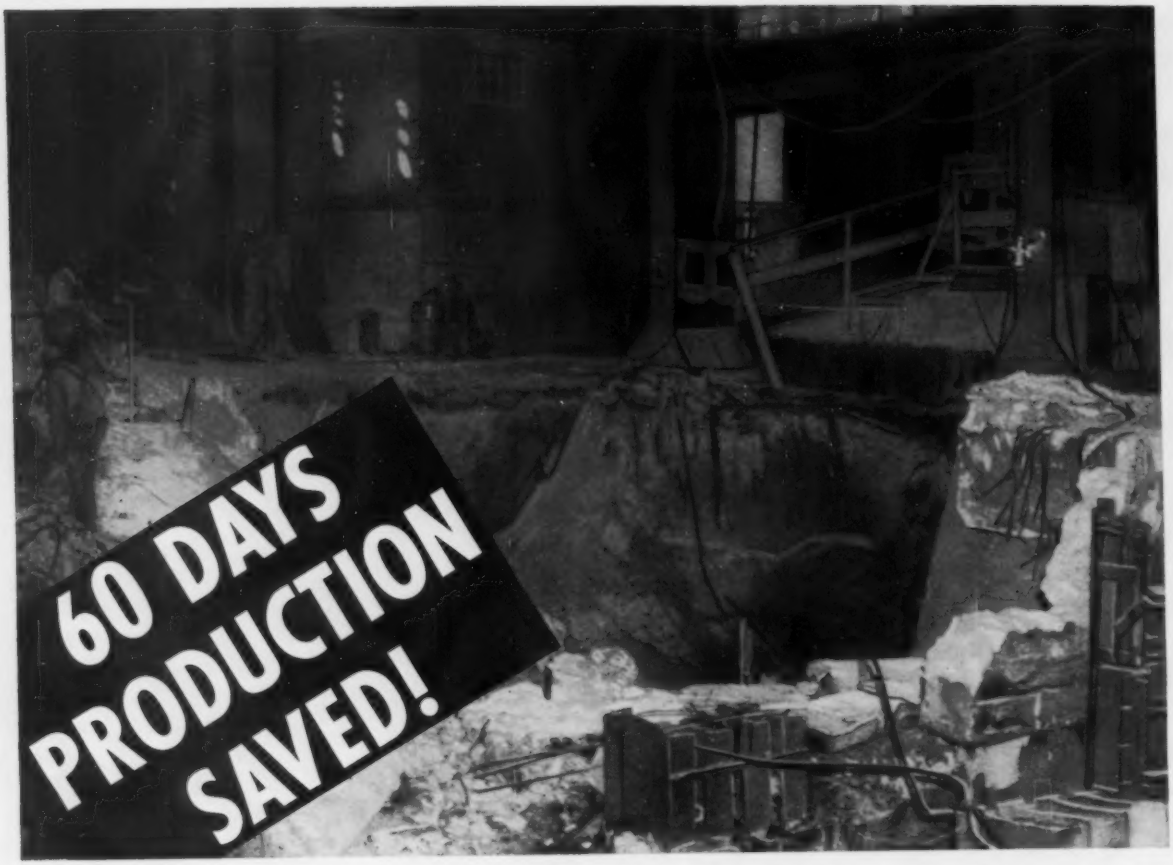
ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS NATIONAL-STANDARD Company NILES, MICHIGAN

WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes



" . . . and this was accomplished without disrupting other work going on in area . . . and, more important, without an accident!"

Early last year, management of a large steel plant decided that its 90" Blooming Mill had to be replaced. Production requirements demanded that the down-time for making the extensive changes . . . including a complete tear-out of the old foundation . . . had to be held to a minimum.

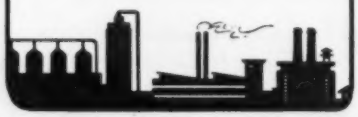
It was at this point that CHICAGO CONCRETE BREAKING COMPANY was called in for consultation. Realizing the vital importance of every hour to the plant, CHICAGO CONCRETE'S skilled blasting experts used a three-dimensional model of the foundations to lay out the drilling pattern. As a result of this careful planning, 95% of the drilling was accomplished PRIOR TO SHUT-DOWN OF THE MILL AND WITHOUT ANY INTERFERENCE WITH PRODUCTION.

Thus, blasting was performed simultaneously with the removal of the mill. Using modern methods, developed over 35 years of experience, CHICAGO CONCRETE was able to control-blast and remove 5,200 cubic yards of concrete and slag SOME 60 DAYS AHEAD OF THE TIME NORMALLY TAKEN BY OLD-FASHIONED METHODS. Needless to say, reconstruction was able to begin well ahead of schedule.

With careful planning, intelligent preliminary work, and skill . . . born of experience and developed over three decades . . . the job was completed in minimum time, ahead of schedule, and without an accident. This is but another example of the service available to you by CHICAGO CONCRETE BREAKING COMPANY . . .

AND NOW

CHICAGO CONCRETE CONSTRUCTION COMPANY offers a complete industrial construction service . . . handling anything from minor masonry, steel or foundation repairs to complete furnace rebuilds.



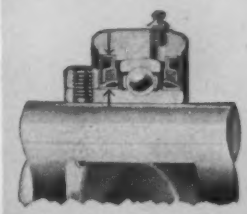
CHICAGO CONCRETE BREAKING CO.

EDWARD GRAY, PRESIDENT

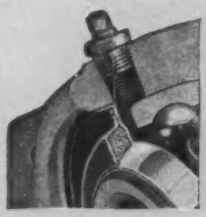
12233 S. AVENUE "O", Chicago 33, Ill., BAyport 1-8400 — PITTSBURGH AREA - 213 Corey Ave., Braddock, Pa., Electric 1-1656

SERVING THE PRIMARY METALS AND OIL INDUSTRIES WITH KNOW HOW, EQUIPMENT AND MANPOWER FOR 35 YEARS

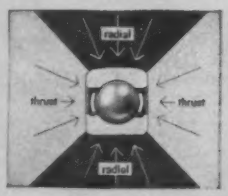
MORE FACTS on why more and more leading manufacturers choose Link-Belt bearings



POSITIVE PROTECTION from moisture, dust and dirt is provided by self-aligning seals extending from housing to inner ring. Aligning surfaces are enclosed and lubricated, assuring free alignment.



AUTOMATIC RELIEF OF EXCESS GREASE PRESSURE is provided through lubrication fitting and patented seal arrangement. Extra large grease capacity extends lubrication intervals.



HIGHEST CAPACITY available to carry radial, thrust or combination radial-thrust loads is provided by single-row, deep-groove design.

RUGGED HOUSINGS result from superior foundry practices. Base is cored to assure stress-free, maximum-strength casting.

DIRTY CONDITIONS around this portable asphalt mixer manufactured by K. E. McConnaughay Co., Lafayette, Ind., make Link-Belt ball bearings the logical choice.

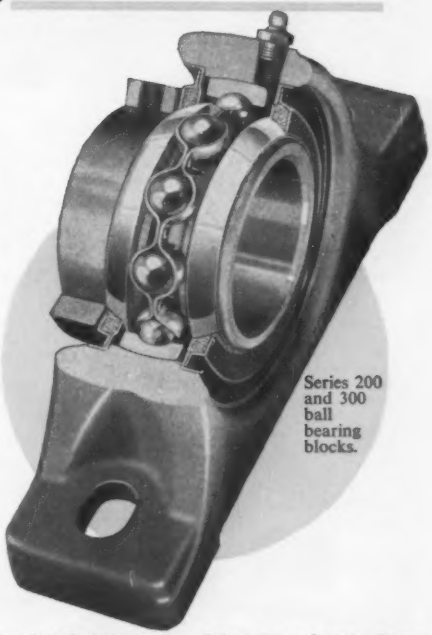
grease stays in, dirt out

thanks to the effective sealing of Link-Belt ball bearings

HERE'S an important extra only Link-Belt gives you on ball bearing blocks! *It's an exclusive seal arrangement*—all aligning surfaces as well as rolling elements are fully lubricated and sealed, assuring long, maintenance-free performance.

All seals are self-aligning—extra assurance that grease stays in, dirt stays out, regardless of alignment. The single-row bearing, too, is self-aligning—in all directions. Free rolling and full load capacity are maintained despite shaft deflection or misalignment.

Both Link-Belt ball and roller bearings offer the "fully-protected" sealing feature. Choose from industry's most complete line of pillow blocks, flange, flange cartridge, cartridge, takeup and hanger blocks. Ask any one of the 40 Link-Belt offices or an authorized stock-carrying distributor for Data Book 2550.



Series 200 and 300 ball bearing blocks.

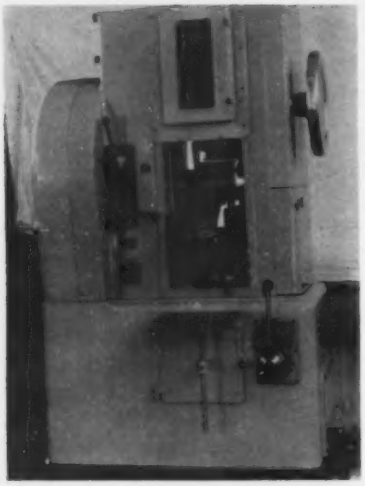
LINK-BELT

Ball and Roller Bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,059

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 89 or 90.



Briquetting press has single shot, central lube

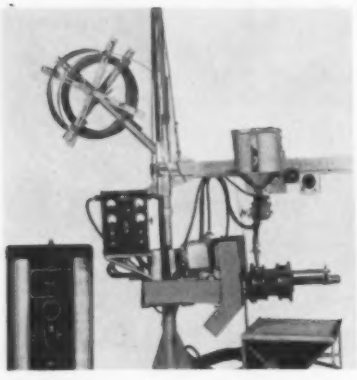
One shot, central lubrication, a special volume controlled filler shoe mechanism, and a new core rod bracket are among additions to mechanical briquetting presses recently developed. The new central lubrication system reaches 21 press points, including clutch, main bearings and all moving parts. A convenient lever at press' front right side makes for easy operation, according to the manufacturer. A "separated" filler shoe provides a measured amount of powder into the die in any desired quantity. Divided into two sections, a hopper and the shoe, the mechanism is cam operated to deliver a predtermined quantity of powder to the shoe. This is the portion that moves over the die. A damper between this section and the hopper from which powder is delivered is actuated by a cam, preset for the desired amount. As a result, parts are made with uniform material volume. New core rod bracket is said to simplify tool design by permitting use of short core pins attached to a stationary core rod. *Haller, Inc.*

For more data circle No. 28 on postcard, p. 89

Like new autos, fork lifts boast new style silhouette

Introduction of an entirely new lift truck series in 3000, 4000 and 5000 lb capacity models on pneumatic tires has been announced. Featuring a new body style, gasoline powered lifts reflect current automotive trends typified by compact, close to ground silhouette, increased safety, automobile-like controls, greater operator comfort and faster operating speed. Maker boasts of exclusive trunnion steer wheels, short overall length and the industry's shortest turning radius. They are thought to be the most maneuverable of any penumatic tire lift truck in their capacity range. Long wheelbase offers added stability. It is also described as having lowest center of gravity and lowest seat height. Brakes are self energizing in both directions with a 125 sq. in. braking area. Operator's visibility is improved. Optional: power steering, torque converter, 100 attachments. *Hyster Co.*

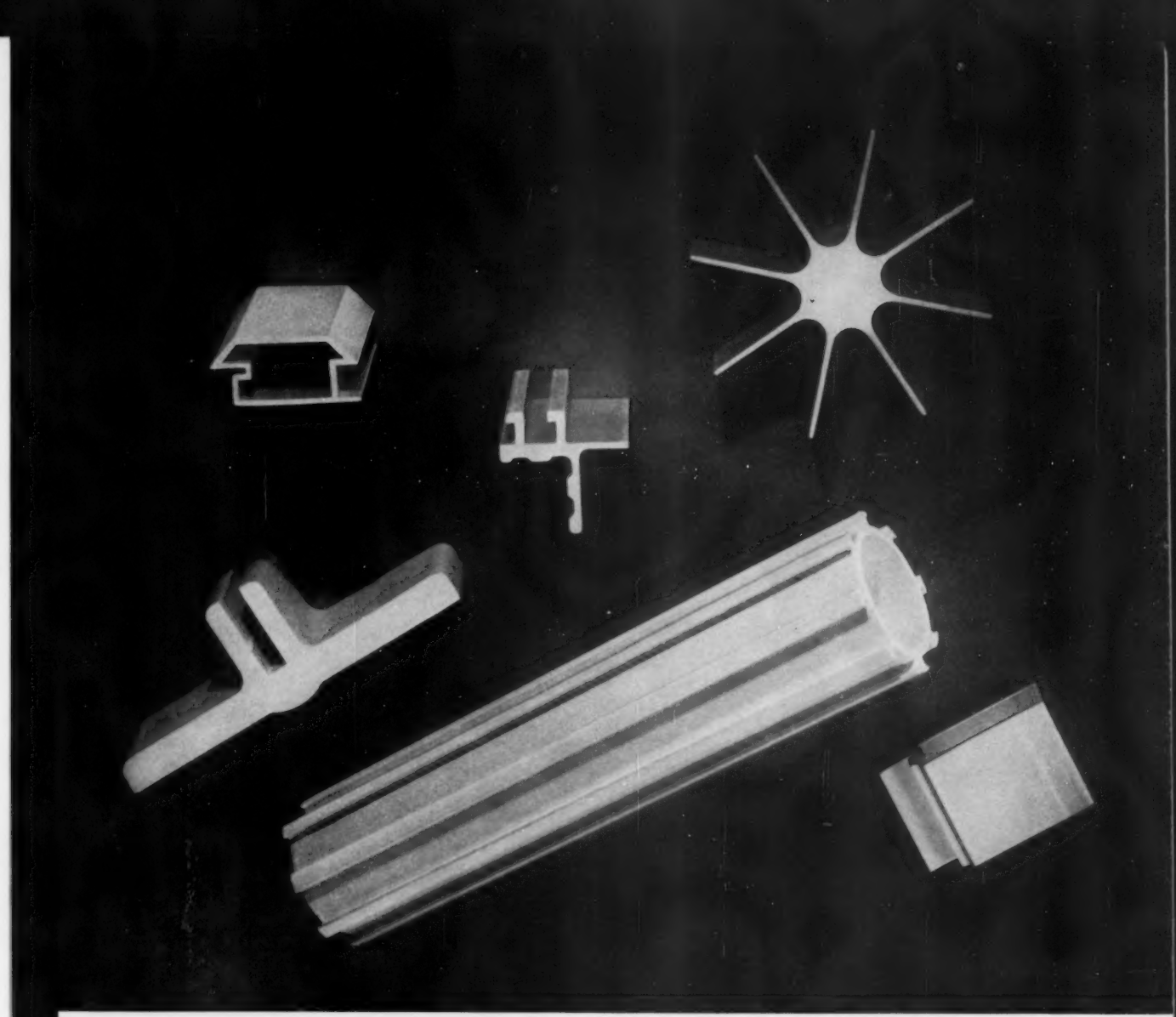
For more data circle No. 29 on postcard, p. 89



Roll and idler welder is automatic and versatile

This new roll and idler welder, and positioner boasts quick and easy changeover. Whether hard-facing tractor rolls, building up flanges, or other circular weldments, or even longitudinal weldments, the machine will take them automatically. The automatic head is said to be of exclusive design and operates on higher than normal welding voltage, resulting in higher torque and faster speed response. Wider changes of rod feed rate allow use of a variety of rod sizes and compositions without changing gearing. Rod feed motor is designed for 110v current. Most rod feed motors are designed for 32v, and operate on arc voltage which ordinarily varies, or is adjustable from 20 to 45v. Five to 10v above or below the 32v motor can result in very unfavorable effect, whereas variation has less effect on 110v motor. *Sight Feed Generator Co.*

For more data circle No. 30 on postcard, p. 89



These Extrusions are made of Aluminum

. . . and Men!

When you order aluminum extrusions from Michael Flynn, we put our years of metal-working experience to work for you . . . the skill of engineers and metallurgists who know metals and design.

We choose the proper aluminum alloy for the service conditions encountered by your product . . . stresses, strains, temperatures. We study the profile to determine how to achieve maximum strength with a minimum amount of metal.

Every operation, from casting the aluminum billets to final inspection, is under rigid control to maintain quality and keep costs down.

Strategically located in the heart of Delaware Valley, U.S.A. Stock dies available for most standard profiles. Estimates furnished promptly. Call or write us today.

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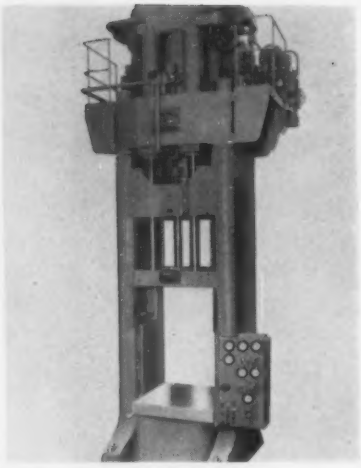
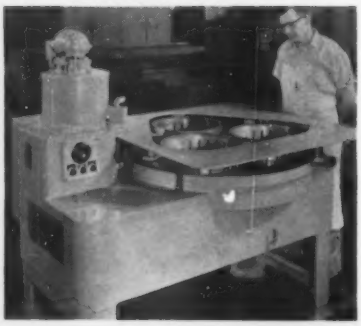


Hydraulic press has electromagnetic controls

New electric magnet controls of this 575 ton press enable operator to make speed, timing and pressure adjustments from the press' main control panel. For instance, ram can approach at highest speed, slow down as it enters draw, change speed during draw, strip slowly, speed up, slow down again to softly pick up blankholder and return to up start position. Furthermore, manufacturer indicates, this cycle pattern can be changed to a new set up simply by resetting six control knobs on the main control panel. No cams are used to make these speed changes. It is stated that this flexibility in cycle timing provides an added protection to expensive dies by applying easy pressure at the point of contact and withdrawal. Because highest speed can be maintained wherever possible during a complete stroke of this new press, the overall time is reduced, makers say. Press has four-point pressure adjustment of the blankholder. By turning four wheels exact pressure at each point is applied. *A. B. Farquhar Div., Oliver Corp.*

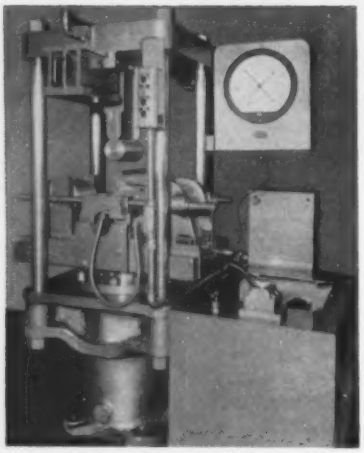
For more data circle No. 31 on postcard, p. 89



Lapping machine has more capacity

Higher capacity and larger parts handling are highlights of a new 36 in. lapping machine. Inside diam of the conditioning rings is 14½ in., thus permitting parts that size. Capacity-wise, it will take well over twice as many one in. parts as the 24 in. model. Roller bar attachment has been designed to provide operator with shelf space for placing pressure plates or fixtures. Drain hole is on the side, and a wiper blade is fastened to the underside of the base table to bring all spent compound into the drain. A rubber hose, fastened to drain plug, allows a container to be placed under machine. A fork style agitator is placed at a 30° angle in the tank to aid mixing abrasive when loaded overnight. *Crane Packing Co.*

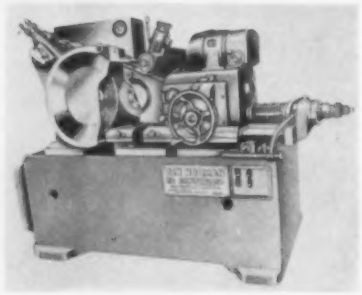
For more data circle No. 32 on postcard, p. 89



Cold bending tests to 150,000 lb made on tester machine

Cold bending tests up to 150,000 lb can be made quickly with this new testing machine. Low carbon steel bars up to two in. square or two in. diam in lengths of five to 24 in. can be bent. It also accommodates flats up to four in. wide and one in. thick in the same lengths. Press is hydraulically operated at controllable table speeds of 1½ or less to 10 in. per minute. Maximum upward stroke is 11 in. Loads are measured by an Emery bourdon tube indicating system with 12 in. diam dial graduated in 500 lb divisions. A feature of the machine is its sliding platforms which can be used quickly after making a "V" bend with rollers, to bend specimens 180 degrees, or flat on themselves. These platens and the machine structure are designed to withstand the transfer of flattening loads off center. Overloads are prevented by limit switches and overload pressure relief valve. Two support roller stands are adjustably spaced and centered. *Baldwin-Lima-Hamilton Corp.*

For more data circle No. 33 on postcard, p. 89



Centerless grinder is called three machines in one

This rugged, precision built, heavy duty grinder contains some new features. It precision grinds parts fast, holds tolerances and cuts overall grinding costs, maker says. Described as three machines in one, it is a standard centerless grinder for throughfeed work, a standard grinder for infeed jobs and equipped with the crush dressing attachment. It forms grinds and does profile work. Machine finish grinds parts from solid or finish grinds rough turned parts. Grinder has hard chrome plated Vee and flat table ways and unit type grinding wheel construction enclosed with double row sealed bearings. *Van Norman Mach. Co.*

For more data circle No. 34 on postcard, p. 89

PUNCHING

104 holes every 10 seconds *accurately*

The multiple punching of these holes must be very rapid, and their location as well as spacing must be held accurately.

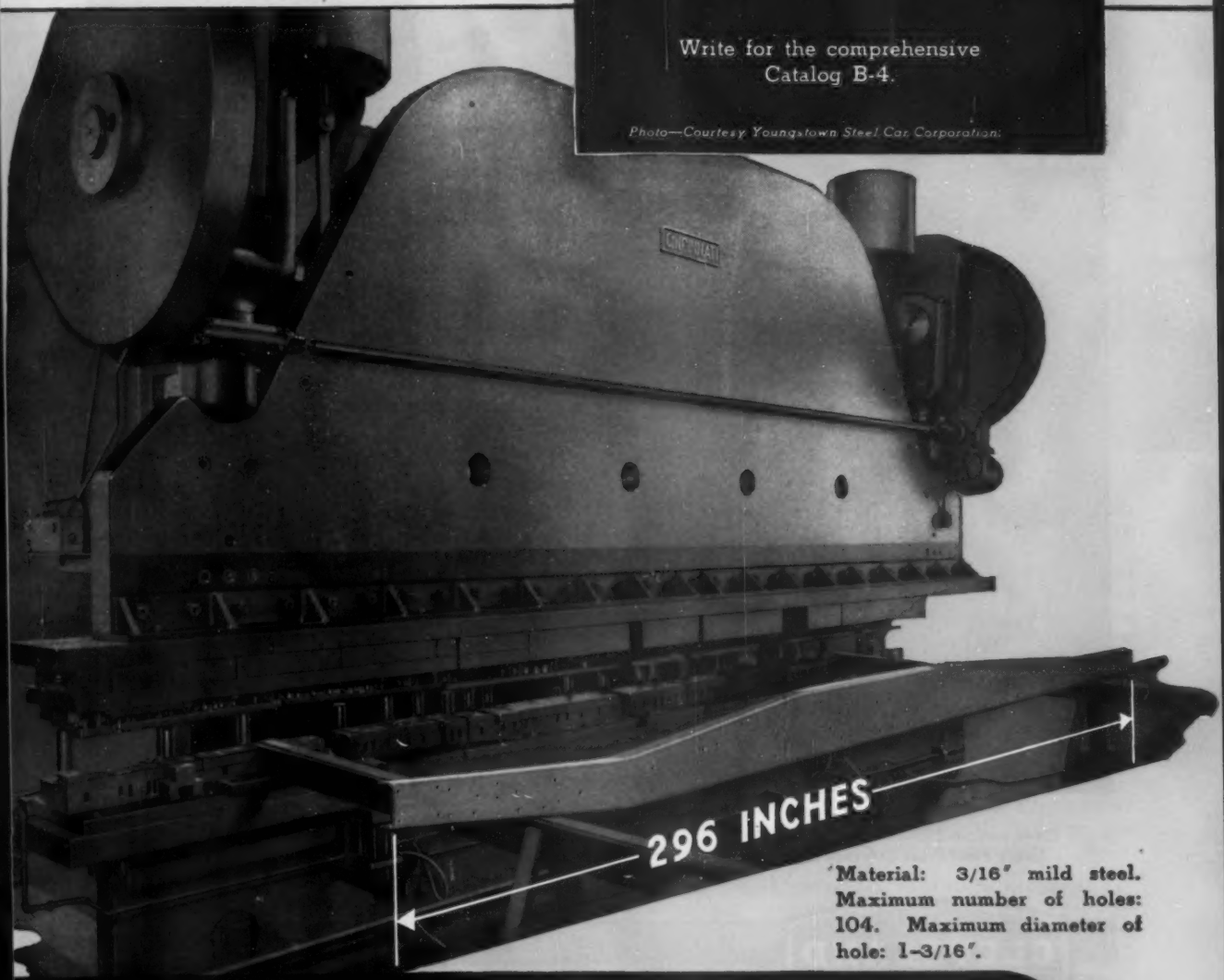
The assembly of these 24 trailer frames is smooth and economical with no costly hand fitting.

With this punching equipment, position, size and spacing of holes may be changed quickly and at low cost.

The Brake can perform many other operations as desired—converting from one operation to another quickly and at low cost.

Write for the comprehensive Catalog B-4.

Photo—Courtesy Youngstown Steel Car Corporation.



Material: 3/16″ mild steel. Maximum number of holes: 104. Maximum diameter of hole: 1-3/16″.

CINCINNATI

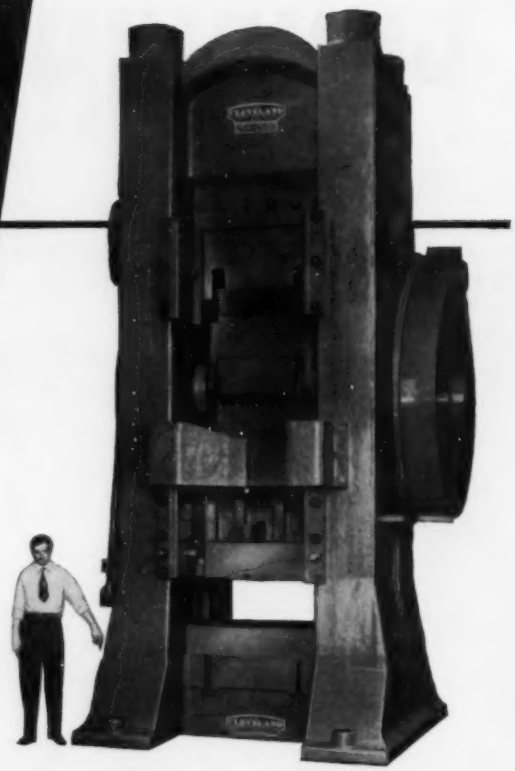
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

250 TONS OR 2500 TONS

Large or small . . .
your stampings cost less
with a
CLEVELAND PRESS!

Cleveland S1-250-36-42 Straight Sided Single Point Press *250 tons capacity*



Cleveland 25K Knuckle Joint Press *2500 tons capacity*

Each of the 11 specialized types of Cleveland Presses is made in a wide range of sizes. You're sure of getting the exact press to give you utmost production economy.

The construction of all Clevelands is simple and powerful featuring ease of adjustment, minimum wear of moving parts, economy of operation and production accuracy.

You'll find that our patented Cleveland Clutch minimizes costly down-time. It gives you positive, fast control of the slide during all phases of operation. This reduces stamping rejects. What's more its light-weight design requires less horsepower for operation.

Extremely long slide bearing surfaces and rugged frame construction eliminate slide deflection even under maximum load.

These important Cleveland features assure you of lower unit stamping costs. Before you buy your next press won't you let us give you the complete Cleveland story? Just write or call today!

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES – FABRICATING TOOLS

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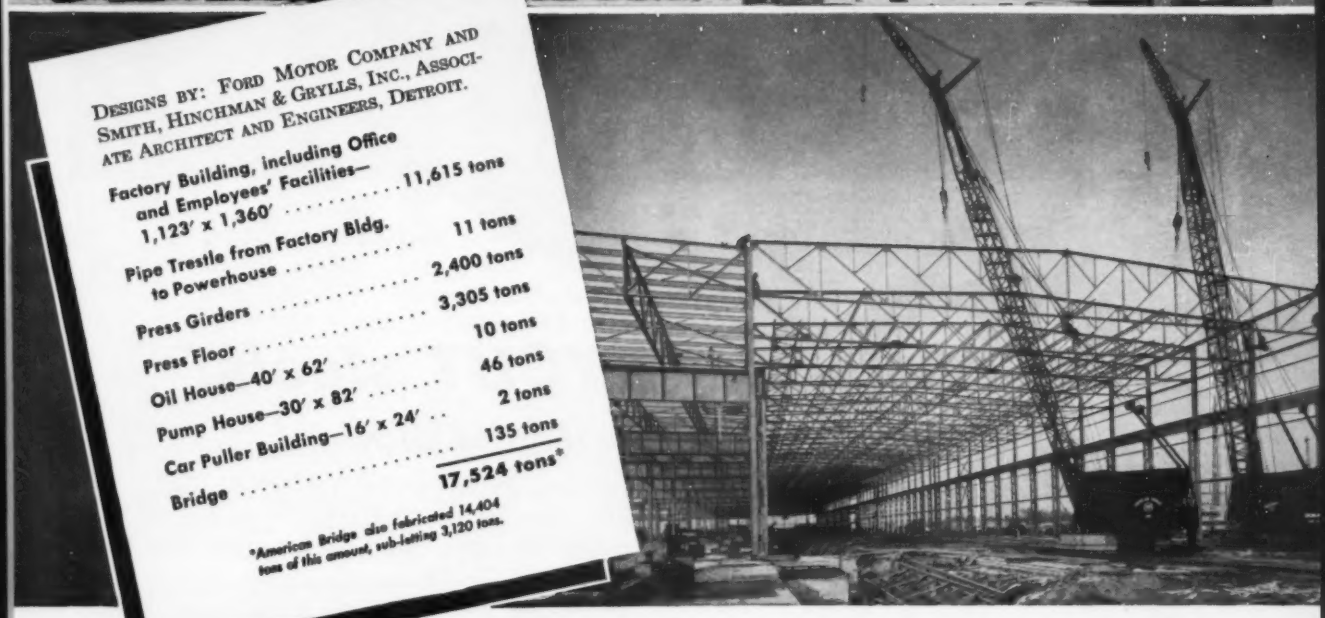
CITY FOUNDRY DIVISION · SMALL TOOL DEPARTMENT

AMERICAN BRIDGE

erects 17,524 tons of steelwork in just 4 months

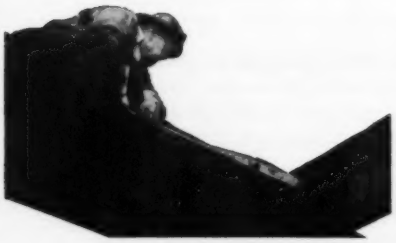
for **FORD'S NEW METAL STAMPING PLANT**



DESIGNS BY: FORD MOTOR COMPANY AND SMITH, HINCHMAN & GRYLLS, INC., ASSOCIATE ARCHITECT AND ENGINEERS, DETROIT.

Factory Building, including Office and Employees' Facilities—1,123′ x 1,360′	11,615 tons
Pipe Trestle from Factory Bldg. to Powerhouse	11 tons
Press Girders	2,400 tons
Press Floor	3,305 tons
Oil House—40′ x 62′	10 tons
Pump House—30′ x 82′	46 tons
Car Puller Building—16′ x 24′	2 tons
Bridge	135 tons
	17,524 tons*

*American Bridge also fabricated 14,404 tons of this amount, sub-letting 3,120 tons.



BOLTED—All field connections on this job were made with high tensile and ordinary bolts.

The Ford Motor Company will begin operation of its fourth metal stamping plant late this summer.

Located near Chicago Heights, about 25 miles from the Loop, the new plant is as modern as you'll find anywhere. The mammoth steel frame main building is 1123′ wide by 1360′ wide and provides 1,700,000 square feet of floor space, for offices, employee facilities, and the factory.

The plant is designed to accommodate 22 major and 21 intermediate lines of giant 50- to 1,000-ton presses. When full production is reached, the plant will employ approximately 4,000 people and turn out upwards of 160 freight-car loads of automobile body stampings per day.

17,524 tons of structural steel went into the vast building. American Bridge fabricated 14,404 tons and erected the entire 17,524 tons. In the panel above is listed the tonnage used in the project. All field connections were made with high tensile and ordinary bolts.

If you would like to know more about the advantages of having American Bridge fabricate and erect the structural steel work for your expanding industrial facilities, just contact our nearest office.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION • GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

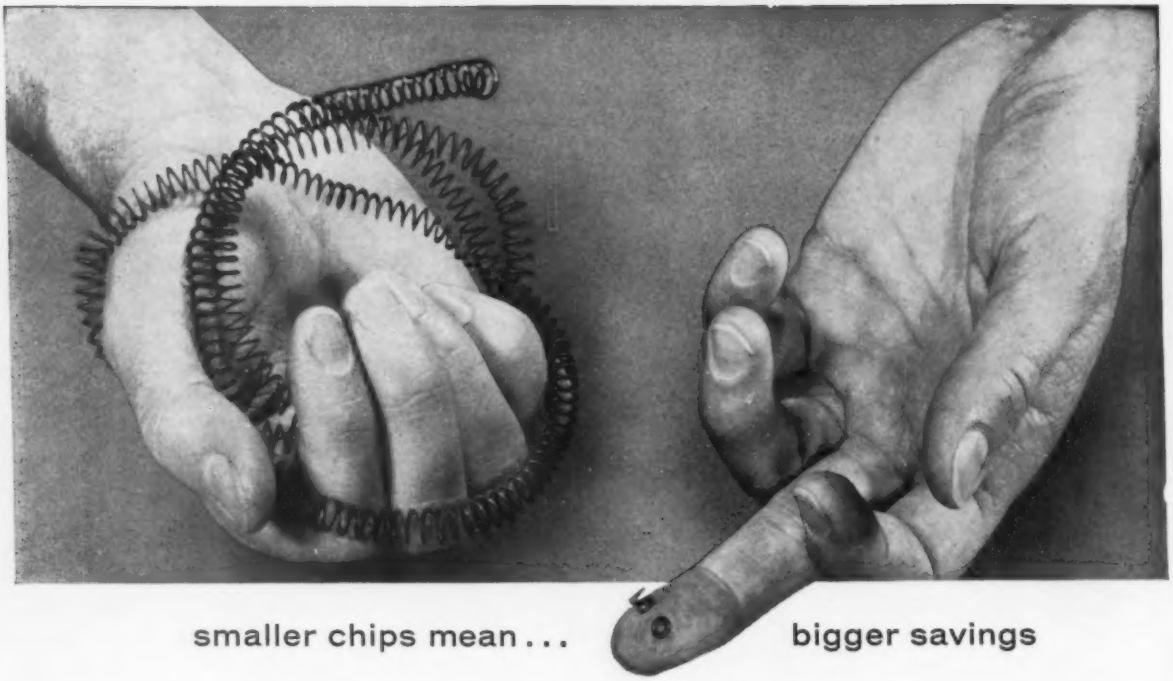
Contracting Offices in: AMBRIDGE • ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • ELMIRA • GARY HOUSTON • LOS ANGELES • MEMPHIS • MINNEAPOLIS • NEW YORK • ORANGE, TEXAS • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ROANOKE • ST. LOUIS • SAN FRANCISCO • TRENTON

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN BRIDGE

INTERESTING MOTION PICTURES AVAILABLE—"Building for the Nations" and "The Suspension Bridge," two entertaining and educational films, now available without charge to businesses, fraternal and civic organizations, churches, schools and colleges. Write to Pittsburgh office for bookings.

UNITED STATES STEEL



smaller chips mean . . . bigger savings

Cut costs with RYCUT steels!

Three new Ryerson leaded alloys

These short, fast-breaking chips have real meaning to cost-conscious purchasing and production men. In an ever-increasing number of shops, small chips like these mean that the switch has been made to Rycut steels. They mean that tools are turning faster—that production is up as much as 200%.

The secret of Rycut's machining speed is a minute quantity of lead, finely dispersed throughout the steel. This acts as a lubricant between tool and steel. The results are revolutionizing machine shop practice:

- Up to 200% more parts can be produced per machine hour!
- Tool life is lengthened as much as 300%!
- Finish is improved!

There's a Rycut leaded alloy for every application. Use RYCUT 20 when you need a carburizing alloy; RYCUT 40 for .40 carbon alloy applications; and RYCUT 50 for .50 carbon alloy uses. Every one is a cost-cutter.

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The Iron Age SUMMARY . . .

Steel strike costing 1.2 million ingot tons each week . . . Chances of early settlement are slim . . . Contract cost is big stumbling block . . . No government intervention.

Strike Losses . . . Before the steel strike is settled, the country may lose 17 million tons—or more—of steel ingots. The shutdown is costing the nation 2.1 million tons of raw steel each week.

There is nothing to suggest an early end to the strike. The way things stand this week, the walkout could easily run to eight weeks or more.

Both sides are miles apart on basic points, with length of contract a relatively minor item. Furthermore, they're both smarting under the lash of public name-calling of the last several weeks.

Dave McDonald of steel labor made a big gamble—and lost. He figured the industry would hold still for a big-time settlement—from his viewpoint—to avoid a strike. But the pill was just too big for the industry to swallow. The cost of last-minute union proposals would have been prohibitive.

Behind Firm Stand . . . There are several reasons behind the firm stand taken by steel companies for a long-term, medium-cost contract. First, the producers are tired of being blamed for each new wave of inflation. They want to get out from under the label of pace-setter for wage-price increases. And second, they figure this is the year for the union to give a little, to make collective bargaining what it should be—a two-way street.

Before a three-year contract is agreed upon, some fringe will fall by the wayside to bring the cost to around 20 cents an hour. Steel management will not buy a package that would put it behind the eight ball with the public and the government from an inflation standpoint.

When the strike is settled, there will be a steel price boost of $8 a ton—or more—with subsequent advances as each contract year passes, probably of lesser amounts.

Construction Suffers . . . A two-week strike would completely upset every major building and construction program in the country. Steel structurals and plate, major items in construction, were in short supply before the strike began.

A four-week strike would find most users conserving their inventories to maintain a semblance of production. An eight-week walkout would bring chaos.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	370	1,875	2,388	2,075
Ingot Index				
(1947-1949=100)	23.0	116.3	148.7	129.0
Operating Rates				
Chicago	5.0	75.0*	98.5	92.0
Pittsburgh	8.0	80.0*	100.0	93.0
Philadelphia	5.0	79.0*	106.0	85.0
Valley	11.0	77.5*	99.0	88.0
West	28.5	97.5*	103.0	81.0
Detroit	27.0	78.0*	98.0	82.0
Buffalo	5.0	78.5*	105.0	86.0
Cleveland	0.0	80.5*	102.5	89.0
Birmingham	3.5	21.5*	23.5	84.0
S. Ohio River	37	84.0*	95.0	71.0
Wheeling	51.0	83.0*	106.0	99.0
St. Louis	68.0	75.0*	95.0	82.0
Northeast	13.0	78.0*	84.0	89.0
Aggregate	15.0†	76.0*	97.0	86.0

*Revised
†Tentative

Prices At A Glance

(cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.179	5.179	5.179	4.797
Pig Iron (Gross Ton)	$60.29	$60.29	$60.29	$56.59
Scrap, No. 1 hvy (gross ton)	$44.83	$44.83	$45.83	$37.17
Nonferrous				
Aluminum ingot	25.90	25.90	25.90	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	34.50	34.50	34.50	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	94.75	95.00	96.25	95.00
Zinc, E. St. Louis	13.50	13.50	13.50	12.50

LABOR

Brace For Long Steel Strike

Both sides in steel hassle are miles apart as strike begins . . . Chances of Washington intervention are pretty slim . . . Cost is main problem—*By Tom Campbell.*

◆ STEEL USERS had better get braced for a long and bitter strike. Both sides are miles apart. No cozy little meeting behind the scenes in Washington or any place else is going to settle quickly the basic differences in this year's steel wage hassle.

Wide Apart

Each side speaks a different language. Management has repeatedly talked about costs based on accepted accounting practices. Just as often, the union has talked about what the worker gets in his pay envelope. To make matters more confusing, the union has also dragged in the "cost after taxes" to support its huge demands.

Industry Position

But even these differences could be surmounted were it not for certain management positions. These make this year's negotiations quite different from those which have gone before. Here they are:

■ **The industry has taken a stand that it would be no pushover this year despite good business and despite its collective desire to do nothing to hurt Mr. Eisenhower's chances for re-election.**

■ **The Big Three negotiating team of U. S. Steel, Bethlehem, and Republic have eliminated U. S. Steel Corp. as a pattern setter. With nine other firms looking over the shoulders of the Big Three, there was no chance of a break in the solid steel front.**

■ **The industry was tired of being blamed for setting off inflationary fires each year. At the same time, it had hoped to gain industrial peace by offering what it considered to be a decent wage-fringe package; a 5-year, no-strike, 65-cents-an-hour deal.**

Union Position

On the union's side, the following factors were a strong deterrent for a quick settlement:

■ **The union was loaded for bear this year. It wants its best and biggest package in view of what it believes is a strong industry profit picture.**

■ **The union will consider a three-year contract but its idea of take-home pay and fringe is something that blanched the faces of the steel negotiators.**

■ **The union wants premium pay for Sunday that is in no way connected with or similar to the so-called shift differential. They want to divorce the two entirely.**

■ **The union believes the 10-cent-an-hour offer by Tennessee Coal & Iron Div., of U. S. Steel, to striking railroad workers is a "sign" of what they, the steel workers, can get, plus fringes—if they hold out long enough.**

■ **The union would lose face with the steel workers if it took a package that was insisted upon—with minor variations—by management from the very first day it was offered.**

No Quick Solution

Most of these positions of management and union will not be resolved easily. The battle of the statements as each side sought to win public support—or escape the blame for a strike—indicated from the beginning that things were going to get rough.

Reports that there were strong differences among some of the steel companies a few weeks ago are correct. But these differences were not strong enough to cause any bending in the solid steel curtain. It is usual for most steel company presidents to be vocal and realistic with each other, but this year the highly-private exchanges were particularly sulphurous.

There are some steel officials who were ready to accept a three-year contract. But they will never accept such an agreement calling for the items which the steel union wants included—the industry just "can't take it." When the union says 20 cents an hour, that really means to steel officials a cost of about 26 cents an hour—a whale of a difference when you are trying to plan for a three-year expansion.

Neutral Suggestions

A cross-section of authoritative opinion among both sides suggests that the following decisions will have to be made if a dangerously-long strike is to be avoided:

■ **The union will have to greatly reduce its idea of how much it can get as take-home pay in each of the three years it would be willing to commit itself for in a no-strike contract.**

■ **If the union wants fringe it will have to give on take-home pay and if it wants a big take-home pay raise it will have to wipe out some of the fancy fringe.**

■ **The steel companies will have to come down from their four-year, four-month contract stand. The union will not accept a contract for such a length of time.**

Few Bitter Exchanges

The union is through getting headline concessions each year as far as the steel companies are concerned. It can expect no help from the government, or from its friends in steel management, until the area of thinking gets a whole lot clearer than it is this week.

It is doubtful if labor relations have been seriously damaged by the disagreement so far. Management and union negotiators had a minimum of bitter exchanges. If anything, the exchanges between the steel negotiators and the union people were less volcanic than some of those which preceded the united stand taken by the 12 steel presidents at their private conclave.

Continued on p. 152

Comparison of Prices

(Effective July 2, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	July 2 1956	June 26 1956	June 5 1956	July 5 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.28	6.28	6.28	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.80
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.85	$9.85	$9.85	$9.05
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. ternes	9.10	9.10	9.10	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.60¢	6.60¢	6.60¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.179¢	5.179¢	5.179¢	4.797¢

	July 2 1956	June 26 1956	June 5 1956	July 5 1955
Pig Iron: (per gross ton)				
Foundry del'd Phila.	$65.26	$65.26	$65.26	$61.19
Foundry Valley	60.50	60.50	[illegible]	56.50
Foundry, Southern Cin'ti	62.98	62.98		60.48
Foundry, Birmingham	56.33	55.00	55.00	52.88
Foundry, Chicago	60.50	60.50	60.50	56.50
Basic del'd Philadelphia	64.48	64.48	64.48	60.27
Basic, Valley furnace	60.00	60.00	60.00	56.00
Malleable, Chicago	60.50	60.50	60.50	56.50
Malleable, Valley	60.50	60.50	60.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢

‡ 74.76 pct Mn base.

Pig Iron Composite: (per gross ton)				
Pig iron	$57.17	$60.29	$60.29	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$44.50	$44.50	$37.50
No. 1 steel, Phila. area	46.50	46.50	47.50	38.50
No. 1 steel, Chicago	43.50	43.50	45.50	35.50
No. 1 bundles, Detroit	37.50	37.50	37.50	29.00
Low phos., Youngstown	46.50	46.50	51.00	38.50
No. 1 mach'y cast, Pittsburgh	54.50	54.50	56.50	43.50
No. 1 mach'y cast, Philadel'a.	54.50	54.50	54.50	44.50
No. 1 mach'y cast, Chicago	47.50	47.50	49.50	47.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$44.83	$44.83	$45.83	$37.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$13.25
Foundry coke, prompt	17.50	17.50	17.50	16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	46.00	46.00	46.00	36.00
Copper, Lake, Conn.	46.00	46.00	46.00	36.00
Tin, Straits, New York	94.75†	95.00	93.625	95.25
Zinc, East St. Louis	13.50	13.50	13.50	12.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	25.90	25.90	25.90	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	34.50	34.50	34.50	29.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on p. 136→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	62.00	62.50	63.00	63.50	.....
Birdsboro, Pa. *B6*	62.00	62.50	63.00	63.50	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	59.00	59.00*	63.00	.....	.....
Buffalo *R3*	60.00	60.50	61.00	61.50	.....
Buffalo *H1*	60.00	60.50	61.00	.....	.....
Buffalo *W6*	60.00	60.50	61.00	61.50	.....
Chester *C17*	62.00	62.50	63.00	.....	.....
Chicago *I4*	60.00	60.50	60.50	61.00	.....
Cleveland *A5*	60.00	60.50	60.50	61.00	65.00†
Cleveland *R3*	60.00	60.50	60.50	61.00	.....
Duluth *I4*	60.00	60.50	60.50	61.00	65.00
Erie *I4*	60.00	60.50	60.50	61.00	65.00
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	67.50	68.00	.....	.....	.....
Geneva, Utah *C7*	60.00	60.50	.....	.....	.....
Granite City *G2*	61.90	62.40	62.90	.....	.....
Hubbard *Y1*	.....	.....	60.50	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Midland *C11*	60.00	.....	.....	.....	.....
Minnequa *C6*	62.00	62.50	63.00	.....	.....
Monessen *P6*	60.00	.....	.....	.....	.....
Neville Is. *P4*	60.00	60.50	60.50	61.00	65.00†
N. Tonawanda *T1*	.....	60.50	61.00	61.50	.....
Pittsburgh *U1*	60.00	.....	60.50	61.00	.....
Sharpsville *S3*	60.00	60.50	60.50	61.00	.....
So. Chicago *R3*	60.00	.....	60.50	.....	.....
Steelton *B3*	62.00	62.50	63.00	63.50	68.00
Swedeland *A2*	62.00	62.50	63.00	63.50	.....
Toledo *I4*	60.00	60.50	60.50	61.00	.....
Troy, N. Y. *R3*	62.00	62.50	63.00	63.50	68.00
Youngstown *Y1*	.....	.....	60.50	61.00	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos.

Silvery Iron: Buffalo, *H1*, $70.25; Jackson, *J1*, *G1*, $69.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	201	202	301	302	303	304	316	321	347	410	416	430
Ingots, reroll.	18.50	19.75	19.25	20.50	—	21.75	33.00	26.50	35.25	15.00	—	15.25
Slabs, billets, reroll.	23.00	25.50	23.75	26.25	26.75	27.50	41.75	33.50	44.50	19.50	—	19.75
Forg. dcs., die blks., rgs.	—	—	—	—	—	—	—	—	—	—	—	—
Billets, forging	—	31.00	31.75	32.00	34.75	33.75	52.75	39.75	52.50	25.50	26.00	26.00
Bars, struct.	—	36.75	38.00	38.25	41.00	40.25	62.75	47.25	62.00	30.50	31.00	31.00
Plates	—	38.75	40.00	40.25	42.75	43.00	66.00	51.25	66.75	31.75	33.00	32.25
Sheets	42.25	42.50	44.25	44.50	52.25	47.25	70.25	56.25	75.50	36.25	—	36.75
Strip, hot-rolled	31.00	33.50	32.00	34.50	—	37.25	59.75	45.75	61.25	28.00	—	28.75
Strip, cold-rolled	39.00	42.50	41.00	44.50	—	47.25	70.25	56.25	75.50	36.25	—	36.75
Wire CF, HR; Rod HR	—	—	36.00	36.25	39.00	38.25	59.75	45.00	59.00	29.00	29.50	29.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2* (2.25¢ lower on Type 430), *J2;* Baltimore, *E1;* Middletown, O., *A7)* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6;* Gary, *U1.*

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y. *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5)* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa.,*C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

Scrap Resists Strike Effect

Price fluctuations few and far between as contract deadline approached . . . Trade established cushion against severe price drops, strike or no strike . . . Composite unchanged.

◆ THE SCRAP TRADE fought a war of nerves down to the steel contract deadline, with the market maintaining surprising strength in the face of an uncertain future.

But a number of factors combined to create an artificial cushion against a strike of moderate or short duration, which prevented the trade from running for cover and depressing prices as the deadline approached.

Reason for the strength of the market was that inventories at the mill are low, and dealer yards nearly bare. Both buyers and sellers realized that it would take a strike of some duration to depress the market to an extreme level.

In some market areas, electric mills planned their annual shutdowns for vacations to coincide with the strike deadline, which minimized any strike threat in the face of a two-week shutdown strike or no strike. In other areas, small mills had made agreements to extend their contracts from the June 30 deadline, permitting them to operate and take delivery of scrap.

Elsewhere, mills had made arrangements to lay scrap down, regardless of outcome. Many dealers also scheduled their summer vacations for the uncertain period following the negotiations, minimizing possible strike effects.

Few price changes were recorded in the major markets and THE IRON AGE Composite remained at $44.83.

Only fluctuations reported were in Chicago, where limited quantities of railroad material began moving; Birmingham, which saw some activity in electric furnace grades; and in New York, where cast prices were cut $1.

Pittsburgh . . . Prices are unchanged here. A flurry of broker buying that developed as June orders approached expiration date has given the market a firmer tone. Another strengthening factor is the fall-off in scrap collections, which are down about 50 pct. Only the uncertainty of steel mill operations kept the market from rebounding. It appeared that major mills would continue accepting shipments of scrap in this area.

Chicago . . . The market showed little change except that increased quantities of railroad material began moving on lower priced orders during the week. Activity was concentrated on cleaning up existing orders. Result is that many yards are lower on scrap than at any time since the first quarter. This has caused some speculative broker buying. Hold orders, affecting dealer scrap most strongly, were general as the strike deadline approached. Extreme resistance to lower rail grades is being encountered.

Philadelphia . . . Most yards closed down for vacations this week so the steel labor situation offered no immediate crisis. The last major mill served notice to hold all shipments last Friday. But an undercurrent of optimism was in evidence due mainly to industrial average predictions for the month of July, which were higher than in June. Market held stable.

New York . . . The steel labor situation had virtually paralyzed this market. Export sales are maintaining steelmaking and blast furnace grade prices for the time being. Some brokers are dickering for new export orders at higher prices, but it is doubtful if they can get them at this time. A major consumer has cut cast prices $1 for its July orders.

Detroit . . . Activity was at a standstill with dealers waiting for some indication which direction the market will take. Industrial grades are holding up well despite the uncertainty surrounding the dealer market. With two local mills closing for regular vacation periods this week, the market for both industrial and dealer grades will be limited in this area.

Cleveland . . . The weight of steel wage negotiations kept the scrap market at a virtual standstill with most area mills holding up shipments until settlement. Underlying strength of the market kept prices from fluctuating despite the uncertainty.

Birmingham . . . Uncertainty due to the labor situation brought the openhearth scrap market to a complete standstill. Mills placed a deadline of June 22 for shipment of scrap purchased earlier last month. However, there were purchases of electric furnace grades. Some railroad items and electric furnace bundles were off $1 to $2 per ton. The cast market was active and strong. No foundries in the district are faced with the possibility of a strike at this time. The export market is quiet with prices steady.

St. Louis . . . Market continues at a standstill. Mills are laying down scrap and say they will accept all shipments against contracts. But most contracts will have been filled by this week. Prices are unchanged but may have to be increased when consumers re-enter the market.

Cincinnati . . . This market was less affected by labor uncertainty because of the no-strike precedent established by the area's major consumer. Scrap inventories are not excessive and scrap generation is down, creating a basically strong market.

Buffalo . . . No activity here. Dealers kept buying for stockpile. Most foundries which ordinarily buy small quantities are on vacation, cutting off even this small market.

Boston . . . Effects of steel labor talks halted all activity. Only the export market showed a little sign of life, though not enough to affect prices.

West Coast . . . Prices continue unchanged in all major markets. The seasonal lull is on and mills were awaiting outcome of labor negotiations before making commitments. The export market continues brisk.

Leaders in Iron & Steel Scrap Since 1889
For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.
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Scrap Prices *(Effective July 2, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and ms. turn.	32.00 to 33.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. punch'gs plate	51.00 to 52.00
Heavy turnings	42.00 to 43.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
R.R. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast	54.00 to 55.00
Cupola cast	46.00 to 47.00
Heavy breakable cast	44.00 to 45.00

Chicago

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 factory bundles	49.00 to 50.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	32.00 to 33.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. forge crops	54.00 to 55.00
Low phos. punch'gs plate	52.00 to 53.00
Low phos. 3 ft and under	50.00 to 52.00
No. 1 RR. hvy. melting	49.00 to 50.00
Scrap rails, random lgth	60.00 to 61.00
Rerolling rails	68.00 to 69.00
Rails 2 ft and under	67.00 to 68.00
Locomotive tires, cut	55.00 to 56.00
Cut bolsters & side frames	55.00 to 56.00
Angles and splice bars	61.00 to 62.00
RR. steel car axles	68.00 to 70.00
RR. couplers and knuckles	54.00 to 55.00
No. 1 machine cast	47.00 to 48.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	38.00 to 39.00
Cast iron brake shoe	38.00 to 39.00
Cast iron wheel	49.00 to 50.00
Malleable	58.00 to 59.00
Stove plate	40.00 to 41.00
Steel car wheels	54.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	31.00 to 32.00
Mixed bor. short turn.	33.00 to 34.00
Cast iron borings	37.00 to 38.00
Shoveling turnings	35.00 to 36.00
Clean cast chem. borings	43.00 to 44.00
Low phos. 5 ft and under	50.00 to 51.00
Low phos. 2 ft and under	51.00 to 52.00
Low phos. punch'gs	51.00 to 52.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	43.00 to 44.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
Rails 18 in. and under	63.00 to 64.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	50.00 to 51.00
Cast iron car wheels	57.00 to 58.00
Malleable	64.00 to 65.00
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast	54.00 to 55.00

Cleveland

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	43.00 to 44.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Cut struct'r'l & plates, 2 ft & under	51.00 to 52.00
Drop forge flashings	43.00 to 44.00
Low phos. punch'gs, plate	44.00 to 45.00
Foundry steel, 2 ft & under	49.00 to 50.00
No. 1 RR. heavy melting	48.00 to 49.00
Rails 2 ft and under	67.00 to 68.00
Rails 18 in. and under	68.00 to 69.00
Railroad grate bars	39.00 to 40.00
Steel axle turnings	35.00 to 36.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast	53.00 to 54.00
Stove plate	50.00 to 51.00
Malleable	59.00 to 60.00

Youngstown

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. plate	46.00 to 47.00

Buffalo

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 busheling	44.00 to 45.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	53.00 to 54.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast	50.00 to 51.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles, openhearth	37.00 to 38.00
No. 2 bundles	26.50 to 27.50
New busheling	37.00 to 38.00
Drop forge flashings	36.50 to 37.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.50 to 23.00
Cast iron borings	22.00 to 23.00
Low phos. punch'gs, plate	37.00 to 38.00
No. 1 cupola cast	41.00 to 42.00
Heavy breakable cast	34.00 to 35.00
Stove plate	35.00 to 36.00
Automotive cast	44.00 to 45.00

St. Louis

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	39.50 to 40.50
No. 2 bundles	30.00 to 31.00
Machine shop turn.	22.00 to 23.00
Cast iron borings	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
No. 1 RR. hvy. melting	48.50 to 49.50
Rails, random lengths	50.00 to 51.00
Rails 18 in. and under	62.00 to 63.00
Locomotive tires uncut	50.00 to 51.00
Angles and splice bars	50.00 to 51.00
Std. steel car axles	56.00 to 57.00
RR. specialties	54.00 to 55.00
Cupola cast	46.00 to 47.00
Heavy breakable cast	32.00 to 33.00
Cast iron brake shoes	42.00 to 43.00
Stove plate	40.00 to 41.00
Cast iron car wheels	43.00 to 44.00
Rerolling rails	65.00 to 66.00
Unstripped motor blocks	32.00 to 33.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	26.00 to 26.50
No. 1 bundles	34.00 to 35.00
No. 2 bundles	25.00 to 25.50
No. 1 busheling	34.00 to 35.00
Elec. furnace, 3 ft & under	37.00 to 38.00
Machine shop turn.	20.00 to 20.50
Mixed bor. and short turn.	23.00 to 23.50
Shoveling turnings	24.00 to 24.50
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast	42.50 to 43.00
Mixed cupola cast	36.00 to 37.00
Heavy breakable cast	39.50 to 40.50
Stove plate	35.00 to 36.00
Unstripped motor blocks	25.50 to 26.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast	46.00 to 46.50
Mixed yard cast	43.00 to 43.50
Charging box cast	43.00 to 43.50
Heavy breakable cast	43.00 to 43.50
Unstripped motor blocks	32.00 to 33.00

Birmingham

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	20.00 to 21.00
Electric furnace bundles	39.00 to 40.00
Bar crops and plate	51.00 to 52.00
Structural and plate, 2 ft	49.00 to 50.00
No. 1 RR. hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	54.00 to 55.00
Rails, 18 in. and under	59.00 to 60.00
Angles & splice bars	54.00 to 55.00
Rerolling rails	64.00 to 65.00
No. 1 cupola cast	48.50 to 49.50
Stove plate	47.00 to 48.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	37.50 to 38.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 bundles	42.50 to 43.50
No. 2 bundles	31.50 to 32.50
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	28.00 to 29.00
Low phos. 18 in. & under	51.00 to 52.00
Rails, random lengths	57.00 to 58.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast	43.00 to 44.00
Hvy. breakable cast	43.00 to 44.00
Drop broken cast	52.00 to 53.00

San Francisco

No. 1 hvy. melting	....	$43.00
No. 2 hvy. melting	....	40.00
No. 1 bundles	....	42.00
No. 2 bundles	....	35.00
No. 3 bundles	....	29.00
Machine shop turn.	....	24.00
Cast iron borings	....	25.00
No. 1 RR. hvy. melting	....	43.00
No. 1 cupola cast	....	48.00

Los Angeles

No. 1 hvy. melting	....	$42.00
No. 2 hvy. melting	....	38.00
No. 1 bundles	....	41.00
No. 2 bundles	....	31.00
No. 3 bundles	....	27.00
Machine shop turn.	$21.00 to	22.00
Shoveling turnings	....	24.00
Cast iron borings	....	24.00
Elec. furn. 1 ft and under	....	42.00
No. 1 RR. hvy. melting	....	42.00
No. 1 cupola cast	....	45.00

Seattle

No. 1 hvy. melting	....	$44.00
No. 2 hvy. melting	....	40.00
No. 2 bundles	....	31.00
No. 3 bundles	....	27.00
No. 1 cupola cast	....	45.00
Mixed yard cast	....	45.00

Hamilton, Ont.

No. 1 hvy. melting	....	$43.00
No. 2 hvy. melting	....	38.00
No. 1 bundles	....	43.00
No. 2 bundles	....	35.00
Mixed steel scrap	....	37.00
Bushelings	....	33.50
Bush., new fact., prep'd	....	41.00
Bush., new fact., unprep'd	....	37.00
Machine shop turn.	....	21.00
Short steel turn.	....	26.00
Mixed bor. and turn.	....	22.00
Rails, rerolling	....	51.00
Cast scrap	....	50.00

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BDSA Tightens Nickel Rules

Nickel alloys now fall under jurisdiction of Defense Material System . . . New regulations take generation of nickel scrap into consideration . . . List alloys covered.

◆ STRICT new rules governing nickel alloys and scrap as well as primary nickel, are now in effect as Defense Mineral System, BDSA, moves to tighten up use of the critically-scarce metal for defense uses, ease the civilian market if possible, and keep better track of where nickel is going.

The new rules may result in more nickel becoming available for the civilian market at the 64.5¢ per lb price, because alloy producers will now be required to reuse some of their own scrap instead of selling it.

In addition, officials hope it will tend to restrict the so-called "gray market" in nickel which has been pushing up the price of civilian supplies.

The regulations will have little direct effect on subcontractors, but will for the first time give prime military contractors a duty to check on the accuracy of defense orders of their contractors.

One of the major reasons given by Defense Materials System for including nickel alloys in its jurisdiction is to provide better checks on the amount of nickel actually needed for defense and Atomic Energy Commission programs, so that government can more carefully and more efficiently administer nickel production expansion programs and plan more accurately for full mobilization needs.

For nickel alloyers, new rules are now in effect governing their purchases. For users of nickel alloys, the new rules will go into effect for fourth quarter operations.

Business and Defense Services now insists that producers of alloys deduct from their priority needs of primary nickel the amount of "usable" scrap they have generated in fulfilling defense contracts.

Usable nickel scrap means scrap which can be remelted or processed within the plant. "We're not forcing anyone to get into toll arrangements,"—a BDSA official says. In effect, it means that plants which have been processing their own scrap, must now deduct those amounts from their allotment orders for defense contracts.

Firms in doubt as to whether their nickel scrap is "usable" under the regulations should write to the nickel division of BDSA (Washington 25, D. C.) and ask for an individual ruling.

Orders already placed for fourth quarter nickel alloy deliveries must now be converted to bring them under the defense materials system. And firms must file for allotments under the new regulations. If the first allotment granted does not cover outstanding orders, the firms will be permitted to file a supplemental allotment request, but if that still doesn't cover outstanding orders, the firms will have to cancel or reduce their orders from suppliers. Defense contractors will get preferential nickel alloy delivery, same as they now get on nickel bearing stainless steel.

Alloys affected include those with nickel content of 5 pct or more, up to and including pure nickel, which do not contain 50 pct iron or steel, 40 pct copper, 50 pct aluminum, since these alloys are already under DMS control.

The order covers alloys in the following mill and foundry shapes and forms: ingots, blooms, slabs, and billets; plate, sheet, strip, and foil; rods, bars, pipe, tubing, and shapes either rolled or extruded; wire and wire rod; powder; castings, except gates and risers, rough as cast; and anodes, either rolled or cast.

Not included: primary nickel in electrolytic cathodes, pigs, rondelles, cubes, pellets, shot, oxide, salts, or chemicals; nor primary nickel in ingot or powder for remelting.

For the fourth quarter only, defense contractors may place orders for controlled nickel alloys as soon as they submit their application for allotments, without waiting until they actually receive the allotment, as they will in future.

Copies of the new regulations, (Direction 6 to DMS Reg. 1; BDSA order M-1B, and Direction 7 to BDSA Reg. 2) are available from all Department of Commerce field offices.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in June based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper		Straits tin, New York	94.19
Del'd Conn. Valley	46.00	Zinc, E. St. Louis	13.50
Lake copper, delivered	46.00	Lead, St. Louis	15.80

Note: Quotations are going prices.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	June 27	June 28	June 29	June 30	July 2	July 3
Copper, electro, Conn.	46.00	46.00	46.00	46.00	46.00	46.00*
Copper, Lake, delivered	46.00	46.00	46.00	46.00	46.00	46.00*
Tin, Straits, New York	95.00	95.00	94.75	....	94.75*	94.625*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50*
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80*

Note: Quotations are going prices. *Tentative

Held at 3000°F for five hours, these four brick, commonly recommended to resist high temperatures, show varying effects. Samples 1, 2, and 3 softened and slumped to different degrees, indicating loss of usefulness even below this temperature. Sample 4, a Mullfrax® electric furnace mullite refractory, is unaffected by the heat.

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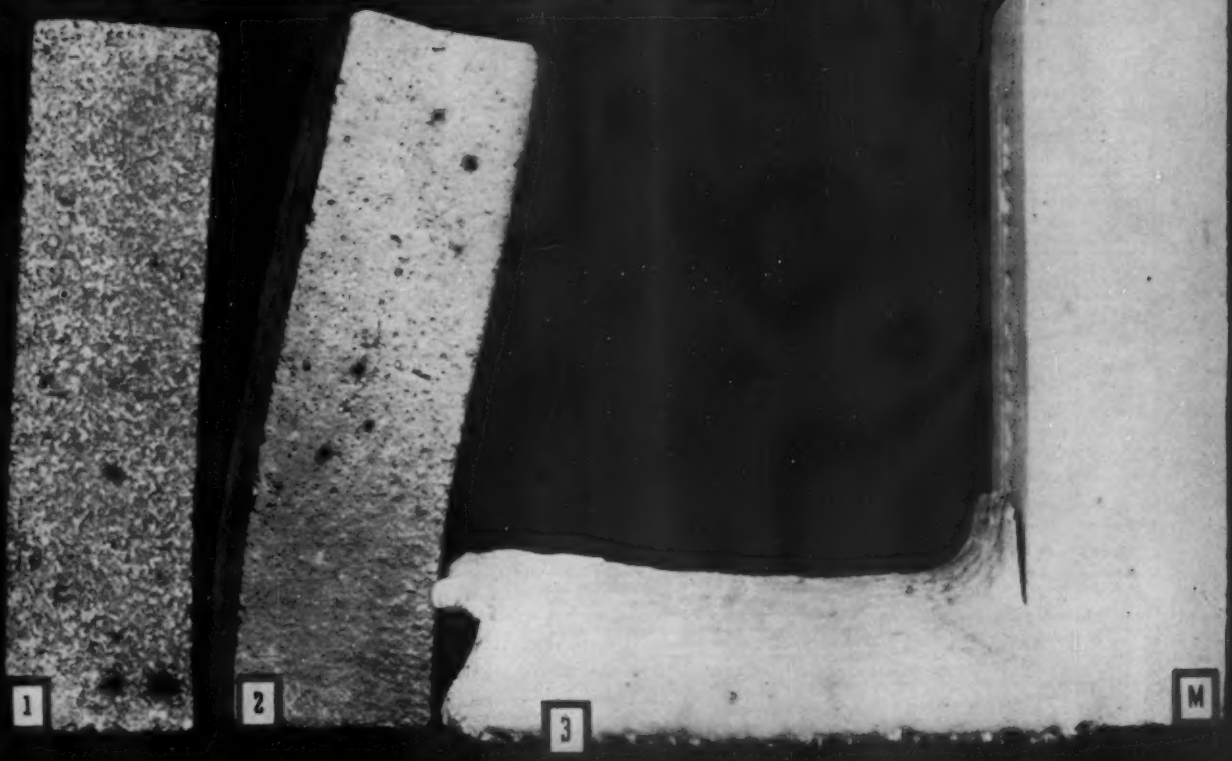

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In practice, of course, you must contend with many more conditions than heat alone. Corrosion, thermal shock, load, abrasion, erosion, etc., are usually combined with temperature. This combination of conditions may tend to lower heat resistance of refractories. That's why a refractory cannot be selected solely on its ability to withstand temperature. It also explains the reason Carborundum offers so many specialized refractories.

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Nonferrous Prices *(Effective July 2, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003....	42.3	40.2	39.0	38.0
5052.....	49.8	44.9	43.2	41.4
6061-0.....	46.9	42.7	40.9	40.8

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8.....	43.1-44.8	58.1-61.7
12-14.....	43.8-45.2	59.0-63.3
24-26.....	46.8-47.2	69.2-73.6
35-38.....	55.1-55.7	92.0-95.8

Screw Machine Stock—2011-T-3

Size*	⅜	⅜-⅝	⅝-1	1⅛-1⅜
Price	56.0	54.9	53.6	51.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length* →	72	96	120	144
.019 gage....	$1.310	$1.742	$2.175	$2.605
.024 gage....	1.630	2.177	2.707	3.247

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250-3.00	.250-2.00	.188	.081	.032
FS1 Stand. Grade	.....	65.6	66.5	75	100
FS1 Spec.	.....	88.9	91.1	103.5	103.1
Tread Plate	.....	67.6	68.9	.....	.....
Tooling Plate	70.2	.....	.....	.....	.....

Extruded Shapes

factor →	6-8	12-14	24-26	35-38
Comm. Grade (FS)	66.4-69.0	67.5-69.6	72.1-72.7	84.9-85.8
Spec. Grade (AZ31B)	81.4-84.0	82.5-84.6	87.1-87.7	99.9-100.8

Alloy Ingot

AZ91B (Die Casting)..... 35 (delivered)
AM3A, AZ92A, AZ91C (Sand Casting) 39.25(Velasco,Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	93	125
Rod, Bar, HR..	87	74	93
Angles, HR ...	87	74	93
Plate, HR	97	87	95
Seamless tube.	122	110	153
Shot, blocks		71	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	68.63	.....	.....	68.82
Brass, 70/30	56.60	57.14	.....	59.51
Brass, Low	61.35	61.89	61.29	64.16
Brass, R L	63.07	63.61	63.01	65.88
Brass, Naval	59.80	65.06	54.11	62.96
Munts Metal	57.84	51.85	53.65	.....
Comm. Bs.	65.33	65.87	65.27	67.89
Mang. Bs.	63.54	66.19	57.64	.....
Phos. Bs. 5%	86.79	84.44	87.29	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight alloyed 25.90
Aluminum pig 24.00
Antimony, American, Laredo, Tex.. 33.50
Beryllium copper, per lb conta'd Be $42.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $74.75
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.70
Cobalt, 97-99% (per lb).....$2.60 to $2.67
Copper, electro, Conn. Valley 46.00
Copper, Lake, delivered 46.00
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz...$100 to $120
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 33.75
ingot 34.50
Magnesium, sticks, 100 to 500 lb.... 56.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$256 to $258
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz..$25 to $34
Platinum, dollars per troy oz..$103 to $105
Silver, New York, cents per troy oz. 90.25
Tin, New York 94.75*
Titanium sponge, grade A-1..$2.95 to $3.25
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $10.00
*Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 35.50
No. 120 ..... 34.25
No. 123 ..... 33.25
80-10-10 ingot
No. 305 ..... 38.75
No. 315 ..... 37.00
88-10-2 ingot
No. 210 ..... 50.25
No. 215 ..... 46.50
No. 245 ..... 41.50
Yellow ingot
No. 405 ..... 28.75
Manganese bronze
No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.75-26.50
0.60 copper max. 25.50-26.25
Piston alloys (No. 122 type)..25.25-25.75
No. 12 alum. (No. 2 grade)...23.75-24.50
108 alloy 24.00-24.50
195 alloy 25.75-26.25
13 alloy (0.60 copper max.)...25.50-26.50
AXS-679 .....24.00-24.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 24.00-24.50
Grade 2—92-95% 23.25-23.75
Grade 3—90-92% 22.50-23.00
Grade 4—85-90% 22.00-22.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	42	41¼
Yellow brass	31¼	29
Red brass	37	36½
Comm. bronze	33½	37⅝
Mang. bronze	28⅞	28½
Yellow brass rod ends	31	...

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire..... 31½
No. 2 copper wire..... 30
Light copper 27½
*Refinery brass 27½
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 31⅛
No. 2 copper wire 30
Light copper 27½
No. 1 composition 27
No. 1 comp. turnings 26½
Hvy. yellow brass solids 18⅞
Brass pipe 18⅛
Radiators 21

Aluminum

Mixed old cast. ..... 15 —16
Mixed new clips ..... 16 —17
Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire 29½ 30
No. 2 copper wire 26½ 27
Light copper 24 24½
Auto radiators (unsweated).. 17½—18
No. 1 composition ..... 23½—24
No. 1 composition turnings... 22½—23
Unlined red car boxes..... 18½—19½
Cocks and faucets ..... 19 —19½
Clean heavy yellow brass.... 16 —16½
Brass pipe ..... 21 —21½
New soft brass clippings .... 22½—23
No. 1 brass rod turnings..... 20 —20¼

Aluminum

Alum. pistons and struts .... 7 — 7½
Aluminum crankcases ..... 12 —12½
1100 (2S) aluminum clippings 15½—16
Old sheet and utensils ..... 12 —12½
Borings and turnings ..... 8½— 9
Industrial castings ..... 12 —12½
2024 (24S) clippings ..... 13 —13½

Zinc

New zinc clippings ..... 7½— 8
Old zinc ..... 4½— 5
Zinc routings 3
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings ..... $1.65-$1.90
Clean nickel turnings $1.50
Nickel anodes ..... $1.65-$1.90
Nickel rod ends ..... $1.65-$1.90
New Monel clippings 70-75
Clean Monel turnings 60-70
Old sheet Monel 65-75
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7½
Batteries, acid free 4½

Miscellaneous

Block tin ..... 82 —84
No. 1 pewter ..... 62½—63
Auto babbitt ..... 42 —42½
Mixed common babbitt ..... 13½—14
Solder joints ..... 18½—19
Siphon tops 48
Small foundry type ..... 15¾—16
Monotype ..... 15 —15⅛
Lino. and stereotype ..... 13½—14
Electrotype ..... 13 —13¼
Hand picked type shells ..... 10½—11
Lino. and stereo. dross ..... 5¾— 6
Electro. dross ..... 4¾— 5

IRON AGE

STEEL PRICES

(Effective July 2, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													13.45 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	6.45 *I3*	4.60 *U1 I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C1*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*			6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal	$78.00 *K1*	$94.00 *K1*	$117.00 *K1*		5.30 *K1*	7.40 *K1*	5.45 *K1*	5.125 *K1*	8.00 *K1*	7.575 *K1*		8.95 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.875 *C7 B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.875 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C10*		6.425 *T2*			
	Houston, Lone Star, Texas	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

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(Effective July 2, 1956)

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Conshohocken, Pa.													
	Coatesville, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.375 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.70 *U1*	$8.40 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.475 *B3*	$9.70 *B3*	$8.40 *B3*	
	Worcester, Mass.										5.675 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.55 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.375 *N4* 5.375 *A5, R3*			
	Sterling, Ill.										5.475 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.375 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *J3, U1, Y1*	5.325 *J3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.375 *Y1*	$9.60 *U1, Y1*	$8.30 *J3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.40 *G2*	6.75 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*								
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R5*					$8.30 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.825 *P6* 5.375 *A5*	$9.60 *J3, U1*	$8.30 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.60 *W3, W5*	$8.30 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.375 *Y1*			
WEST	Fontana, Cal.	5.125 *K1*	6.525 *K1*				7.175 *K1*	9.975 *K1*				$10.35	$9.05	$7.75
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.625 *S2*			
	Los Angeles, Torrance, Cal.										6.175 *B2*			
	Minnequa, Colo.										5.625 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.00 *C7*							5.675 *C7*	$10.35 *C7*	$9.05 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3* 5.375 *T2*	$9.70 *T2*	$8.40 *T2*	
	Houston, Tex.										5.625 *S2*			

IRON AGE

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				5.575 *B3*	7.425 *B3*	6.00 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.00 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							5.35 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 C3			
	Hartford, Conn.			6.75 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.30 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.60 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.70 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.50 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.70 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	4.80 *M7*	4.80 *M7*	6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.90 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.775 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		6.25 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E1*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3,* 5.15 *P13*	4.65 *N4,R3,* 5.15 *P13*	6.25 *B5,W8, W10,A5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, 13,R3* 4.725 *A1*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.60 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	6.25 *A5,C13*		7.425 *A5,C13*	6.00 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.60 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.50 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3, P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.60 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	6.25 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.00 *U1,I3, Y1*	4.50 *I3, U1, Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.70 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		6.25 *C10*	5.75 *C10*	7.425 *C10*	6.00 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	6.25 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.00 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.60 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	6.25 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10, F2*	6.00 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.60 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.20 *K1*		7.00 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.85 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.70 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.55 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.85 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.55 *C7* 7.55 *C6*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	5.15 *A8*	5.15 *A8*									6.90 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.60 *R3,T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.85 *S2*

Steel Prices *(Effective July 2, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	6.00	13.25	9.00	+9.25	11.50	+5.75	14.00	+4.00	14.50	+3.00	15.00	+2.50	16.50	+1.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.50	.....	14.50	.....	16.50	.....	17.00	.....	17.50	.....	18.00	.....	18.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.60	T-1
18	4	1	—	5	2.305	T-4
18	4	2	—	—	1.765	T-2
1.5	4	1.5	8	—	.96	M-1
6	4	2	6	—	1.35	M-3
6	4	3	5	—	1.105	M-3

High-carbon chromium	.77	D-3, D-5
Oil hardened manganese	.42	O-2
Special carbon	.39	W-1
Extra carbon	.33	W-1
Regular carbon	.275	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	46.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (*B9*) Copper, 10 pct, 2 sides, 42.15; 1 side, 33.40.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Tie Galv. Col	Barbed and Twisted Barbless Wire Galv. Col	Merch. Wire Annld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	173	175	7.40	7.80	
Aliquippa, Pa. *J3*	152	162	.....	.....	7.40	7.80	
Atlanta *A8*	154	167	177	180	7.60	8.125	
Bartonville *K2**	154	168	175	181	7.60	8.20	
Buffalo *W6*	.....	.....	.....	.....	7.50	7.90	
Chicago, Ill. *N4***	152	166	175	179	7.50	8.10	
Cleveland *A6*	157	.....	.....	.....	7.50	.....	
Cleveland *A5*	.....	.....	.....	.....	7.40	.....	
Crawfordsville *M4**	154	168	177	181	7.60	8.20	
Donora, Pa. *A5*	152	162	175	175	7.50	7.90	
Duluth *A5*	152	162	175	175	7.50	7.90	
Fairfield, Ala. *T2*	152	162	175	175	7.50	7.90	
Galveston *D4*	157	.....	.....	.....	.....	.....	
Houston *S2*	157	170	.....	180	7.65	8.05	
Johnstown, Pa. *B3**	152	166	.....	175	7.40	7.80	
Joliet, Ill. *A5*	152	162	175	175	7.50	8.10	
Kokomo, Ind. *C9*	154	154	177	177	7.60	8.00	
Los Angeles *B2**	.....	.....	.....	.....	8.35	8.925	
Kansas City *S2*	157	167	178	180	7.65	8.05	
Minnequa *C6*	157	167	162 178	180	7.65	8.05	
Monessen *P6*	152	162	.....	.....	7.40	7.80	
Moline, Ill. *R3*	.....	162	162	.....	.....	.....	
Pittsburg, Cal. *C7*	171	185	.....	199	195	8.45	8.85
Portsmouth *P7*	.....	.....	.....	.....	7.50	.....	
Rankin, Pa. *A5*	152	162	.....	.....	175	7.40	7.90
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	.....	.....	.....	197	195	8.35	8.75
Sparrows Pt. *B3**	154	.....	.....	175	181	7.60	8.20
Struthers, O. *Y1*	.....	.....	.....	.....	.....	7.50	8.00
Worcester *A5*	158	.....	.....	.....	.....	7.70	8.20
Williamsport, Pa. *S5*	.....	.....	160	.....	.....	.....	.....

Galvanized products computed with zinc at 5¢ per lb Exceptions: *zinc at 12.5¢ per lb; ** 13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*	.....	.....	10.90	13.05	15.75
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	.....	9.05	10.65	12.75	15.35
Cleveland *A5*	7.10	9.05	10.65	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	.....
Detroit *D2*	7.20	9.15	10.70	.....	.....
Harrison, N. J. *C11*	.....	.....	10.90	13.05	15.75
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	.....
Pawtucket, R. I. *N7*	7.65	9.35	10.90	13.05	15.75
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*	.....	.....	.....	.....	.....
Wallingford *W1*	7.55	9.35	10.90	13.05	15.75
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.85	10.50	.....	.....
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	32.09	37.37	29.93	.....
	2½	12	43.22	50.31	40.31	.....
	3	12	49.90	58.10	46.55	.....
	3½	11	58.26	67.83	54.34	.....
	4	10	77.36	90.07	72.17	.....
National Tube	2	13	32.09	37.37	29.93	.....
	2½	12	43.22	50.31	40.31	.....
	3	12	49.90	58.10	46.55	.....
	3½	11	58.26	67.83	54.34	.....
	4	10	77.36	90.07	72.17	.....
Pittsburgh Steel	2	13	32.09	37.37	.....	.....
	2½	12	43.22	50.31	.....	.....
	3	12	49.90	58.10	.....	.....
	3½	11	58.26	67.83	.....	.....
	4	10	77.36	90.07	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.31	8.32	8.37	7.65	.....	7.63	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.06	9.35	.....	.....	.....	.....
Boston	.10	8.22	9.17	10.42	8.31	.....	8.51	8.37	8.37	9.96	.....	13.76	.....	16.81
Buffalo	.15	7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.05	.....	13.65	.....	16.70
Chicago	.15	7.28	8.39	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.30	.....	16.35
Cincinnati	.15	7.40	8.38	9.25	7.60	.....	7.89	8.05	7.66	8.30	13.59	13.55	16.44	16.60
Cleveland	.15	7.28	8.39	9.10	7.46	.....	7.77	7.91	7.43	8.15	13.41	13.36	16.26	16.41
Denver	.....	8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.15	7.47	8.58	9.53	7.64	.....	7.88	8.05	7.70	8.19	13.70	13.54	16.55	16.59
Houston	.....	7.85	8.75	10.49	8.15	.....	8.00	8.20	8.25	10.10 9.95	14.35	15.90	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.25	10.10	11.10	8.60	.....	8.85	8.40	8.25	11.00	.....	14.50	.....	18.10
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.39	.....	16.44
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.88	8.98	9.73	8.33	.....	8.31	8.21	8.26	9.87	.....	13.67	.....	16.72
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.44	8.54	9.51	8.09	.....	7.82	7.85	7.83	8.62	.....	13.45	.....	16.50
Pittsburgh	.15	7.28	8.39	9.55	7.46	9.25	7.60	7.58	7.42	8.15	13.85	13.30	16.25	16.35
Portland	.....	7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.30	9.75	10.25	8.45	.....	8.40	8.35	8.25	11.55	.....	14.50	.....	18.10
Seattle	.00	8.75	10.50	10.90	8.90	.....	8.50	8.50	8.60	12.25	.....	14.75	.....	17.80
St. Louis	.15	7.57	8.68	9.54	7.65	.....	7.89	7.95	7.71	8.44	.....	13.59	.....	16.64
St. Paul	.25	7.94	8.59–9.14	9.89	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions. (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

*Plus analysis charge. ‡Deduct for country delivery.

(Effective July 2, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	4.725	5.65	5.825				
So. Chicago *R3*				8.05			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		8.05		5.625	
Gary *U1*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	8.05		5.625	
Ind. Harbor *Y1*				8.05			
Johnstown *B3*		5.65					
Joliet *U1*			5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Lebanon *B3*							12.15
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.15
Pittsburgh *O1*					11.90		12.15
Pittsburgh *P5*							12.15
Pittsburgh *J3*				8.05			
Seattle *B2*				8.40		5.775	12.65
Steelton *B3*	4.725		5.825	8.05		5.625	
Struthers *Y1*				8.05			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				8.05			

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.75
Chicago, f.o.b.	27.00
Detroit, f.o.b.	27.50
New England, del'd	28.55
Seaboard, N. J., f.o.b.	26.75
Philadelphia, f.o.b.	26.50
Swedeland, Pa., f.o.b.	26.50
Painesville, Ohio, f.o.b.	27.50
Erie, Pa., f.o.b.	27.50
Cleveland, del'd	29.43
Cincinnati, del'd	28.59
St. Paul, f.o.b.	26.50
St. Louis, f.o.b.	28.50
Birmingham, f.o.b.	25.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	64.42
Electrodeposited	66.75
Brass, 80-20, ball anodes, 2000 lb or more	60.00
Zinc, ball anodes, 2000 lb lots	21.25
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon	90.50
(rolled depolarized add 3¢ per lb)	
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb bags, per cwt	21.15
Nickel salts, single, 4-100 lb bags	33.25
Nickel chloride, freight allowed, 300 lbs	43.50
Sodium cyanide, domestic, fob N. Y. 200 lb drums	21.55
(Philadelphia price 21.80)	
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	30.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case	Full case 20,000 lb. Quantity or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex, HP, reg. & hvy.

¾" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex, regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount H.C. Heat
Bright Treated	
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34 20
9/16" and ⅝" x 6" and smaller and shorter	31 16
¾", ⅞", 1" x 6" and shorter	9 +11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49 41
9/16" and ⅝" diam. x 6" and shorter	43 39
¾", ⅞", 1" x 6" and shorter	31 20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Packaged, package list	27	38
Bulk, bulk list		
Quantity		
¼-in. diam. & under: 25,000-200,000	20	61
5/16-in. diam. & larger: 15,000-100,000	20	61
All diam. over 3 in. long: 5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
Packaged, package list	24	27
Bulk, bulk list		
Quantity		
⅜-in. diam. & smaller: 25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	113.1
New York	125.6
Chicago	127.5
San Francisco-L. A.	134.8

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick	
Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite	St. ⅝-in. grains
Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	40.00
in sacks	46.00

Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.58
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.18
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

you know, this **miller** *AEA-200-L is quite a deal*

The man's right of course, and here's why: As a welder, it provides a full 200 amperes of ac welding current . . . handles ac or ac-dc electrodes up to 3/16". As a power plant, the rotating field design generator—coupled to Onan CK engine—supplies 4500 watts of 110/220 current; or, 1000 watts of dc power while welding. Waterproof and light weight (435 lbs.), the AEA-200-L offers easy portability, all-weather operation and real versatility. Rubber-tired running gear and road trailer available. Model AEA-200, without auxiliary power, weighs 420 lbs. Larger engine driven units to 350 amperes with generator output of 10KW.

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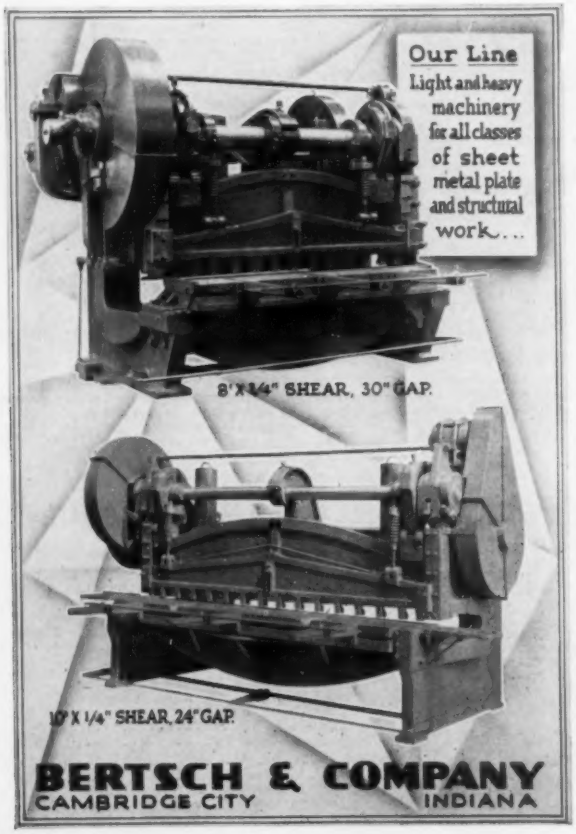
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Light and heavy machinery for all classes of sheet metal plate and structural work...
8' X 1/4" SHEAR, 30" GAP.
10' X 1/4" SHEAR, 24" GAP.

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SAND OR SHELL MOLDED

"C" Steel Castings—sand or shell molded—possess qualities far more interesting than the mere strength of steel. For, in addition to strength they provide more efficient design—better weight-strength ratio—and greater fatigue resistance, i.e., longer life and less replacement. Furthermore "C" Steel Castings, because they are truly foundry engineered from pattern to final casting, require minimum machining and provide better fit plus fast assembly.

If you are interested in castings, the know-how, experience and engineering knowledge of our staff are at your service upon request.

CRUCIBLE STEEL CASTING CO.

LANSDOWNE 1, PENNA.

Ferroalloy Prices

(Effective July 2, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	39.25	0.20% C	36.25
0.03% C	38.75	0.50% C	36.00
0.06% C	37.25	1.00% C	35.25
0.10% C	36.75	1.50% C	35.10
0.15% C	36.50	2.00% C	35.00

4.00-4.50% C, 67.70% Cr, 1-2% Si... 24.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 25.00
0.025% C (Simplex) 32.50
0.10% C, 50-52% Cr, 2% max Si.... 33.75
8.50% max. C, 50-55% Cr, 3-6% Si.. 22.50
8.50% C, 50-55% Cr, 3% max Si.... 22.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (¼" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.35
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	23.00
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19½ Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.75
Sheridan, Pa.	10.75
Philo, Ohio	10.75
S. Duquesne	10.75

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.00
Ton lots packed	15.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$92.00
19 to 21%	3% max.	94.00
21 to 23%	3% max.	96.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	31.5
Ton lots	33.5
250 to 1999 lb	35.5
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 22.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	34.00	36.55	37.75
0.07% max. C	31.95	34.50	35.70
0.10% max. C	31.20	33.75	34.95
0.15% max. C	30.45	33.00	34.20
0.30% max. C	28.95	31.50	32.70
0.50% max. C	28.45	31.00	32.20
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	25.45	28.00	29.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	12.00
Ton lots	13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.55
Ton lots, packed	15.75

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bluk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
	90% Si	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b Langeloth, Pa., per pound Contained Mo $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $200.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.32
bags, f.o.b. Washington, Pa. Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium contract basis, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3.14%, Si 40-45%, per lb contained 2 .... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots 1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn., 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.48
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

for Corrugating and Complete Line of Culvert Equipment—Slitting and Coiling Equipment for Ferrous and Non-Ferrous Material in All Capacities—Warehouse and Steel Mill Cut to Length Lines for Shearing and Levelling Sheets from Coils—Shears for Shearing Sheets and Plates Both Underdriven and Overdriven Types in Capacities to 1¼" Plate.

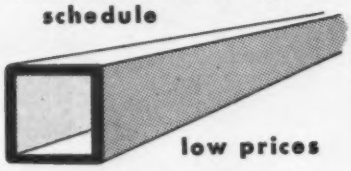
STAMCO, Inc., New Bremen, Ohio

A. J. BOYNTON AND CO.
CONSULTING ENGINEERS
109 N. Wabash Ave., Chicago 2, Ill.

LARGE SQUARE and RECTANGULAR STEEL TUBING STRUCTURAL GRADE

4 x 4 x ¼
4 x 6 x ¼
3 x 8 x ¼
4 x 8 x ¼
6 x 6 x ¼

reasonable delivery schedule



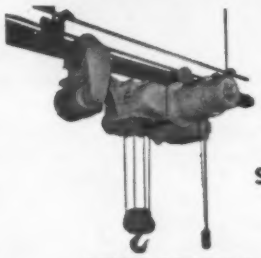
low prices

Harrison SHEET STEEL CO.
4718 W. 5th AVE. CHICAGO 44

Cutting Off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

CRANES—MONORAILS



HAND and ELECTRIC
UP TO FIVE TON CAPACITY
Send for free literature

PENN CRANE-RAIL COMPANY
2100 SO. 61ST STREET PHILADELPHIA 42, PA.
Phone BE 2-1736

COX MACHINES
Pipe Cutting and Threading
Tube Cutting Off
Metal Scrap Bundling
The Cox & Sons Company
Bridgeton, N.J.
Catalog upon request
ESTABLISHED SINCE 1868

"DAVIS" KEYSEATER
Low in Cost. Durable. Easy to operate.
Table adjustable for straight or taper keyways.
Three sizes. Keyways 1/16" up to 1".
DAVIS KEYSEATER CO.
400 Exchange St., Rochester 8, N. Y.

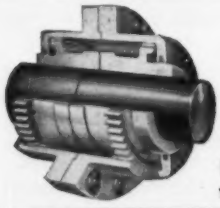
more and more manufacturers are saying: "Let's use

GRIFFIN®
COLD ROLLED STRIP STEEL"

Made to your specifications in all thicknesses from .012 to .375 inches and widths from ⅛" to 19" depending upon gauge.

NARROW ROLLED ROUND EDGE STRIP STEEL In stock at
CENTRAL STEEL & WIRE CO.
Detroit, Chicago, Cincinnati
Wm. H. LEONORI & CO., Inc.
New York City

GRIFFIN
"since 1859"
MANUFACTURING CO., ERIE, PA.

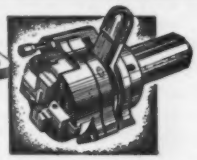


POOLE
FLEXIBLE COUPLINGS
ALL SIZES AND TYPES
CATALOG ON REQUEST
POOLE FOUNDRY & MACHINE CO.
1700 UNION AVE., BALTIMORE 11, MD.

READ
THE ADVERTISING PAGES
for valuable information on
EQUIPMENT
MATERIALS
SERVICES
Sources for every need in the Metalworking industry
The **IRON AGE**

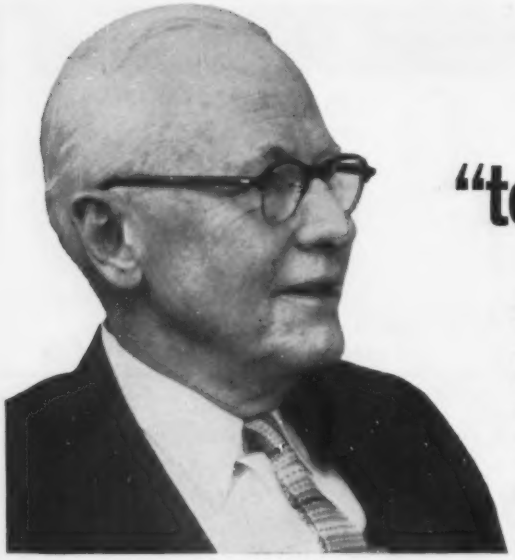
GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

H&G Insert Chaser DIE HEADS



famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 21-41 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Behringer, Inc., 324 N. San Pedro St., Los Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada*



"to reach industrial buying

For all of the 37 years since he left Officers' Training Camp at the close of World War I, Reed Schreiner has been in steel. Seven years ago he became Director of Advertising for the United States Steel Corporation, a position for which he qualified by serving the Corporation and its various subsidiaries in many capacities from copywriter to Assistant Director of Advertising. We recently visited Mr. Schreiner in his Pittsburgh office to learn something about his philosophy and experience in the use of business publications. Here are the highlights of our long and pleasant talk with this seasoned advertiser.

Q Tell me, Mr. Schreiner, just how many years has your corporation been advertising?

A I'm afraid that's a question that cannot be answered without considerable research. This corporation is the sum total of many different organizations whose advertising histories are obscured by time. I think I can best answer your question by saying that we've been at it for a long, long time.

Q I'm certain that the record reveals many interesting highlights and advertising firsts. Among them, what do you consider to be of particular interest?

A Well, one advertising first that immediately occurs to me is the fact that we were among the very first, possibly the first, to use the cartoon technique in industrial advertising.

Q And that was how long ago?

A Offhand, I'd say about 1930.

Q And how about a highlight from your postwar advertising activities?

A Well, as you perhaps already know, we were the first basic material producer to promote the products of our customers in the consumer market on an industry-wide basis. By that I mean we promote the use of steel, not just U.S. Steel, with the firm belief that we will get our fair share of the steel business created.

Q That is very interesting. Tell me, did you use business publications for this undertaking?

A Yes, we did and still do. And very extensively, I might add.

Q Just what is your philosophy in respect to business publications, Mr. Schreiner?

A We regard them as a vital link in our chain of communications. Properly used, they contribute importantly toward the attainment of our sales objectives. We know of no better way to reach industrial buying influences economically and efficiently.

Q Approximately how many business publications do you use?

A Something more than 300.

Q What percentage of your total budget goes into business publication advertising?

A About 28%. And you will be interested to know that this represents the largest single expenditure in our advertising budget.

Q For what specific purposes do you use business publications?

A I would say that we have two basic reasons. The first, of course, is to reach the many and varied buying influences in which we have an interest. The second is to conserve the time of our salesmen.

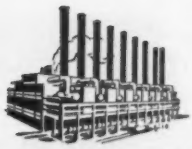
Q With a product and organization such as you have, your salesmen certainly do not have to overcome the more common obstacles, Mr. Schreiner. Just how, then, does business publication advertising help conserve their time?

A In many ways, but I'll illustrate just

one. Not very long ago we developed and introduced a new constructional alloy steel, and we advertised this fact in appropriate business publications. Our salesmen reported that as a result, they generally found the customer familiar with the new product and eager to discuss it. In a word, the advertising had done the spadework for the salesman—had saved him the time it would have taken to introduce this product to an unconditioned prospect.

Q What, in general, do your salespeople have to say about your use of business publications?

A I think their opinion about the value of business publications is best evidenced by the fact that they are constantly after us here in Advertising to do more and more—to add publications, to increase our use of those we are already in.



influences economically and efficiently"

Q What do you think the average reader looks for principally in a business publication?

A For information pertinent to his particular industry, for trade news, for a report on new developments and new products which may directly or indirectly affect him. But more importantly, I think he looks for an accurate, impartial interpretation and analysis of the news and developments within the

industry. It is for this reason that I say business publications have leadership responsibility to their respective industries. Not only do they help the reader do a better job today, but very often they have a definite influence on his personal development and growth within an industry.

Q What general rule or rules do you apply to the preparation of advertisements in business publications?

A We firmly believe in factual information advertising that features the merits of our products without reference to competitive products.

Q Do you feel that advertisements are important to the reader of a business publication?

A Indeed I do. Not so long ago, we asked a group of some 250 busy officials in various industries whether or not they would prefer the business publications they regularly read to carry no advertising. While I am not at all surprised at the outcome, I am surprised by the one-sidedness of the attitude revealed—96% said the elimination of advertising would be highly undesirable.

Q Do you feel that business publications are increasing in importance?

A Definitely. New developments are coming along so fast, and business is becoming so complex, that the need for the many services rendered by business publications is greater than ever before.

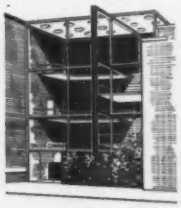
Q What are your criteria for the selection of a business publication?

A In general terms we look for the publications having acceptance within an industry. We naturally consider such important factors as editorial content, circulation, and selling power, but if you find evidence of high reader acceptance you can be certain that all the other considerations are in line.

★ ★ ★

Modern business publications are the all-important link between you and the buying influences you want to reach. They provide the means for reaching your prospects and customers on common ground—at a time when they are receptive to your sales message. In this respect, business publications fill a role unduplicated by any other known selling force.

Chilton publications cover their fields with an editorial excellence and a quality of circulation that assure confidence on the part of readers and advertisers. With such acceptance goes a proportionate selling power. Let Chilton publications help give your advertising maximum effectiveness.



Chilton
COMPANY

Chestnut and 56th Streets • Philadelphia 39, Pennsylvania

CHILTON PUBLICATIONS: Department Store Economist • Hardware Age • The Iron Age • Jewelers' Circular–Keystone • Distribution Age • Motor Age • Automotive Industries • Optical Journal and Review of Optometry • Spectator • Commercial Car Journal • Boot and Shoe Recorder • Hardware World • Gas • Electronic Industries • Butane-Propane News • Book Division

RAILWAY EQUIPMENT
FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

SERVICE-TESTED ®

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline, Diesel-Electric

SPECIAL OFFERING
3—AIR DUMP CARS (SIDE DISCHARGE)
Magor—30-Cubic Yard, 50-Ton Capacity, Lift Door Type

31—ALL-STEEL ORE CARS, HOPPER TYPE
40 and 50-ton capacity
Excellent condition. Immediate delivery!

RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon Cleaned and Tested

CRANES

Overhead and Locomotive

IRON & STEEL PRODUCTS, Inc.

General Office
13496 S. Brainard Ave.
Chicago 33, Illinois
Phone: Mitchell 6-1212

New York Office
50-B Church Street
New York 7, N. Y.
Phone: BEekman 3-8230

"ANYTHING containing IRON or STEEL"

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Spanish Market Opens . . . Recent shipment of a Steckel hot mill to Spain by Frank B. Foster, Inc., Pittsburgh, had a number of interesting implications for used machinery men.

The size of the assembly presented some unusual handling problems. The destination pointed up the growth of Spain as a machinery market. And the route taken called attention to the possibilities that waterways offer for reaching foreign markets.

Disassembly . . . The 20 in. strip mill was purchased from McLouth Steel Co. of Detroit. It was sold and shipped to Manufacturas Metalicas Madrilenas (MMM), S.A., of Madrid. Full assembly weighed 1000 tons. Units as heavy as 57 tons had to be lifted in one piece.

Because of the weights involved, the regular terminal facilities at Detroit could not load the mill. Large units were moved by rail cars and low-boy trucks to Great Lakes Engineering Co. There the mill was loaded aboard a new German freighter.

Great Lakes Boost . . . Despite the 282-ft limitation imposed by the St. Lawrence Canal, the specially designed ship can carry 6000 tons. The Foster company feels that big boats of this type will boost water shipments of machinery from Great Lakes ports and simplify exporting from these areas.

This development, which will be aided by the opening of the St. Lawrence Seaway, comes at a time when foreign markets are calling for more heavy equipment. Colombia, Chile and other South American countries have active steel programs going. They have had a problem finding the U. S. dollars to pay for equipment but are making a strong effort to put steelmaking operations on a paying basis.

Steelmaking facilities are being built near Madrid. Earlier, MMM had bought a sheet mill from the Lewis Machinery division of Blaw-Knox Co., Pittsburgh. The new strip mill is another step in a program that is expected to provide a fully integrated steel works.

Several units like this, comprising 1000 tons of rolling mill machinery were loaded on board ship at Detroit for the voyage to Spanish purchaser.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDER
#500 Wallace Hydr. Bender 180°, Cap'y 2¼"
BENDING ROLLS
6' x 3/16" Niagara, Initial Type
6' x ¾" Webb RsL Initial Type
10' x 10 Ga. Bertsch, Initial Type
12' x ¾" Cleveland Pyramid Type
16' x ¾" Niles Pyramid Type
27' x 1" Southwark Pyramid Type
BRAKES—LEAF TYPE
10' x 10 Ga. Dreis & Krump No. 204
10' x 16 Ga. Dreis & Krump Hand Operated
12' x ¾" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven
BRAKE—PRESS TYPE
10' x ¼" Superior Hydraulic
BULLDOZERS
#5 Williams & White, 29" Stroke, 11½" x 63" Face of Crosshead
#27 Williams & White, 22" Stroke, 16" x 80" Face of Crosshead
CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	25' Span	230 Volt D.C.
5 ton Shepard Niles	45' Span	220/440 A.C.
5 ton Shepard Niles	55' Span	220 Volt D.C.
5 ton P&H	80' Span	220/3/60 A.C.
5 ton P&H	80' Span	500/3/60 A.C.
5 ton Cleveland	96' Span	230 Volt D.C.
10 ton Cyclops	40' Span	220/440 A.C.
10 ton P&H	77' Span	230 Volt D.C.
10 ton Milwaukee	80' Span	230 Volt D.C.
10 ton P&H	96' Span	220 Volt D.C.
50 ton Hand Oper.	100' Span	
120 ton Whiting	80' Span	220/3/60 A.C.

CUT OFF MACHINES
Yoder AD-2 Cut-off, Max. Capacity ⅝" O.D.
Yoder Type L Flying Cut-Off, Cap'y ¾" to 3" Tubing
FORGING MACHINES
2" Ajax, Air Clutch
1" to 5" Acme, Ajax, National
HAMMERS BOARD DROP—STEAM DROP STEAM FORGING—600 lb. to 20,000 lb.
LATHE—TURRET
#2A Warner & Swasey Univ. Type M 510 Preselector Head. LATE.
LEVELLERS—ROLLER
60" United 17 Rolls 3⅝" Dia.
72" McKay 17 Rolls 4¼" Dia.
72" McKay 17 Rolls 2½" Dia. Backed-up
96" McKay 17 Rolls 4⅛" Dia.
MULTI SLIDE MACHINE
No. 35 U. S. Multi Slide Machine
PLANER—OPEN SIDE
48" x 48" x 12' Cincinnati, Three Head
PRESSES—HYDRAULIC
350 ton Southwark Joggling Press
500 ton Clearing H-1500-40, 24" Stroke, Bed 36x42"
600 ton Southwark, 16" Stroke, Bed 60x74"
750 ton Elmes, 54" Stroke, Platen 30¼x38"
800 ton Clearing, 48" Stroke, Bed 48x48"
1000 ton Lake Erie Dble Acting, 46" Strokes, Bed Area & Platen 72" x 146"
1200 ton HPM, Bed Area 100" x 120", 16 Heated Platens
PRESS—STRAIGHT SIDE
Clearing Model TF41500-200 Triple Acting Strokes 40, 32, 14", Bed Area 100" x 200"
PUNCH & SHEAR COMBINATIONS
Style EF Cleveland 36" Throat, Punch 1¼" thru 1" Style W Cleveland 60" Throat, 312 Ton
#1½ Buffalo, Notcher, Punch 1-1/16" x ⅝", Shear Angles 4 x 9/16", etc.
Pels LUSEFF, Punch 1⅝" x 1", Shear Angles 6 x 6 x ¾", Bd. 2½", Sq. 2⅝", etc.
ROLLING MILLS
10" x 16" Single Stand, Two High
12" x 16" Phila. Single Stand, Two High
12" x 20" Standard Single Stand, Two High
15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
22" x 12" x 49" Lewis 3-High Sheet Mill
12" Three High Bar Mill
26" x 54" United Single Stand, Two High
8" Torrington Ring Type Reversing Mill
For cold reducing 7" wide strip
ROLLS FORMING
8 Stand Maplewood, Spindle 2" Dia., 12" Dist. between spindles
SHEAR—BAR
Pels Type 18-23, Capacity 2" Bd., 1⅝" Sq.
SHEARS—GATE
80" x ⅝" Pels
86" x 1" Hilles & Jones
SHEAR—ANGLE
6 x 6 x ⅝" Cleveland
SHEARS—SQUARING
10' x ¼" Cincinnati. LATE
12' x 316" Niagara SL-12
12' x ⅜" Steelweld
SLITTERS
26" Yoder Slitting Line
G-48 Yoder Gang Slitter, 5" Threaded Arbor
STRAIGHTENERS
Kane & Roach 2 Roll Rotary Straightener, M.D. Capacity Mildsteel ¼" to ⅜"
Kane & Roach 5 Roll #5250-B, Capacity ⅜" to 2½" solid, 4¼" Tube
Aetna Standard 12 Roll Straightener. Capacity 2"
SWAGING MACHINE
#6½A Fenn. Capacity 2¼" Tube, 3¾" Solid 16" Die Length, Hydraulic Feed. LATE

Manufacturing

A. T. HENRY & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8
Telephone COrtlandt 7-3437

Equipment

Confidential Certified Appraisals
Liquidations—Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

4" National Upsetter High Duty, guided overarm slide, air clutch
Ajax & National Upsetters, suspended slide, 2½", 3", 4"; similar upsetters not suspended slide, ¾", 1", 1½", 2", 3"
5" Acme Upsetting & Forging Machines suspended slide, cam side die slide
700-ton Ajax High Speed Forging Press
50,000# Standard Double Draw Bench
#3 Abramson Bar & Tube Straightener
Pels FV-75 Bar & Billet Shear, Cap. 7⅛" rd
10' x ½" Plate Shear, Long & Allstatter 10" throat, M.D. Rebuilt
10' x 1" Long & Allstatter Plate Shear
Hilles & Jones and Buffalo Shears 1½", 2", 2½", 3", 3¼", 4" and 4¼"
1600 & 2750# Chambersburg Model F Board Drop Hammers, Roller bearing; double V-ways, Built 1943
1500# Niles & 2500# Chambersburg Single Leg Steam Forging Hammers
4000# Niles Bement Double Frame Steam Forge Hammer
Bradley Hammers, various sizes, including 500# Upright
Nazel Air Forging Hammers, #2-B, 4-B, 5-N
Williams White Bulldozers, #22, #3, #4, #25, #6, #29 U-type
Landis Landmaco and other Landis Threading Machines from ⅜ to 4"
Single and Double End Punches
Multiple Punches
No. 3 Motch & Merryweather Saw, with Saw Grinder

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

DONAHUE STEEL PRODUCTS CO.

1913 W. 74th Street, Chicago 36, Ill.

MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
1	3000	Al. Ch.	720	250	4160/2300
1	1200	Whse.	720	650	2300
1	1120	Elliott	720	260/280	2300
1	500	G.E.	1200	250	2200/440
1	500	Cr. Wh.	720	575/600	2300-440
1	300	G.E.	1200	250/275	2300
1	200	Elliott	1200	125	4000/2300
1	150	G.E.	1200	250	2300/440
1	120	Whse.	1200	250	2300/440
1	100	Al. Ch.	1200	250	4000/2300

LARGE MILL TYPE MOTORS

Qu.	HP	Make	R.P.M.	Volts	Type
1	3000	Whse.	600	525	Tandem
1	1500	Whse.	600	525	Rev.
1	700	Al. Ch.	125	250	Mill
3	600	Al. Ch.	300/600	600	Mill
3	600	Whse.	110/220	220	Mill
1	450	Whse.	450/600	220	SR
1	300	Whse.	300	230	Mill
4	275	Whse.	435/850	230	QM-660.6
1	150	Whse.	360/720	600	QM-660.5

SLIP RING MOTORS
Constant Duty 3 Phase 60 Cycle

Qu.	HP	R.P.M.	Make	Type	Volts
1	100	430	Al.Ch.		440/220
2	100	495	G.E.	1-15A-M	2300
1	100	900	El. Dy.		2300
1	100	1200	Whse.	CW	440/220
1	104	870	Whse.	CW	440/220
1	125	900	G.E.	1-14-M	2200
1	150	450	Whse.	CW-1000	440
1	150	490	Whse.	CW	440/220
1	150	585	Whse.	CW	4160/2250
1	150	720	Al. Ch.	ART	440/220
1	200	435	G.E.	I-M	440
1	200	490	G.E.	I-14-M	2200
2	200	585	G.E.	I-12-M	2200
1	250	300	G.E.	MT-414	2300
1	250	720	Al. Ch.	ART	440
1	350	360	Whse.	CW	2300
1	400	360	G.E.	MT-424	2300/440
1	400	505	Al. Ch.	ART	2200
1	425	392	G.E.	I-M	440
1	450	440	Whse.	CW	2200
1	450	514	G.E.	I-M	2200
1	500	450	G.E.	I-M	2300
1	500	514	Al. Ch.	ANT	2200
1	700	295	Whse.	CW	2300
1	750	400	G.E.	I-M	2200
1	1000	445	Whse.	CW	2300
1	1250	393	Whse.	CW	6600
1	1500	300	G.E.	MT	2300
1	1800	270	Whse.	Mill type	6600
1	2500	257	G.E.	Mill type	6600

T. B. MAC CABE COMPANY

4302 Clarissa St., Philadelphia 40, Penna.
Cable Address "Macsteel" Philadelphia, Pa. Phone Devonport 4-8300

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT

D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	1260	G.E.	MCF	600	650/800
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	230	250/750
3	450	Whse.		550	415
1	250	G.E.	MPC	230	400/600
1	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
2	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	230	368/958
1	120	G.E.	MCF	230	250/1000
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
2	75	C.W.	58H-TEFC	230	860
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1	2000	G.E.	500 25cy	660	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1250	Whse.	720	600	2300
1	750	Whse.	900	250	2300/4000
1	500	Whse.	900	125/250	440

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1	2500	A.C.	Furnace	3	13800x147/113.5
1	2500	A.C.	OISC	3	34520x13800
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	13800x2300
3	500	Kuhl	OISC	1	13200x6600
3	333	G.E.	HS	1	7200x2400/4160Y
3	333	G.E.	HD	1	13200x2300
3	333	G.E.	HSWR	1	2300/4000x230/460
1	300	G.E.	HT	3	4160x480/277
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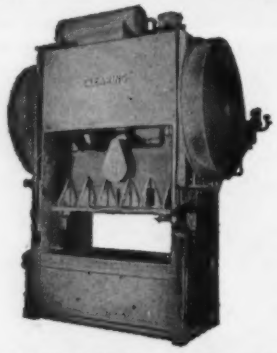

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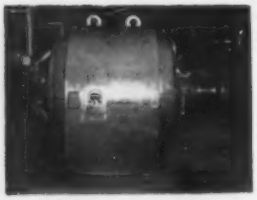

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METALWORKING BRIEFS

Steel Labor (Continued)

The gimmick that Dave McDonald has used before—springing a big deal on the steel people in the last moment—just didn't work this year. Dave now has to have time to retreat gracefully and still get a better package than was first offered to him.

The interesting part of this whole rhubarb is that the steel companies, in their own way, are trying to comply, partly at least, with every demand that was made upon them by the union.

The steel strike will be settled when each side properly interprets and digests what the other has been trying to say during the past few weeks. Outside influences will have little bearing on the outcome, because it is clear that each side knows where the other stands.

Best guess remains as THE IRON AGE has reported, a three-year contract with a first-year package cost of 20 cents an hour, using accepted accounting practice figures (with less in the second and third years). Anything short of this deal will spell a rapid deterioration and dim chances for a short-term strike.

Government intervention will be no more successful at the outset than it was several weeks ago, when behind-the-scenes efforts were made to bring both sides together.

Meanwhile, companies continuing to operate during the strike include Kaiser, Granite City, Laclede, Weirton, Continental, Wisconsin, Middletown plant of Armco, Jessop, Copperweld, and Alan Wood.

That Texas Steel Mill

Working in favor of Jones & Laughlin's chances of obtaining fast-tax writeoff on its proposed Texas mill is the Government's desire for dispersal of industry. (See page 36.) The proposed operation would represent steel expansion removed from existing concentrations of steel capacity. Also, defense mobilization officials say there's a provision in the law to handle exceptional cases such as that of the J. & L. proposition.

AEC Bill Becomes Hot Politics

Controversial legislation directing the Atomic Energy Commission to construct large-scale atomic power plants will have to be settled by Congress. The Senate-House Atomic Energy Committee wants the AEC to spend $400 million on two programs. One provides for fabrication and erection of "large-scale prototype power reactor demonstration facilities capable of producing electric energy in industrial or commercial quantities." The bill is opposed by industry, utility companies, and the Eisenhower administration.

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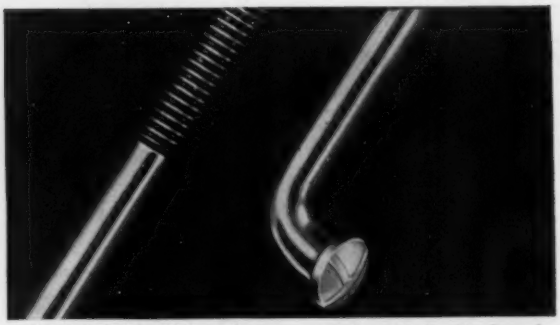

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Gage	Type 2 Coating	"A" Coating	"B" Coating	"C" Coating
6	0.70 oz	0.90 oz	1.80 oz	2.70 oz
9	.60	.80	1.60	2.40
12	.50	.80	1.60	2.40
16	.35	.50	1.00	1.50

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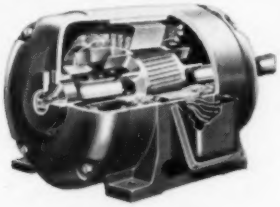

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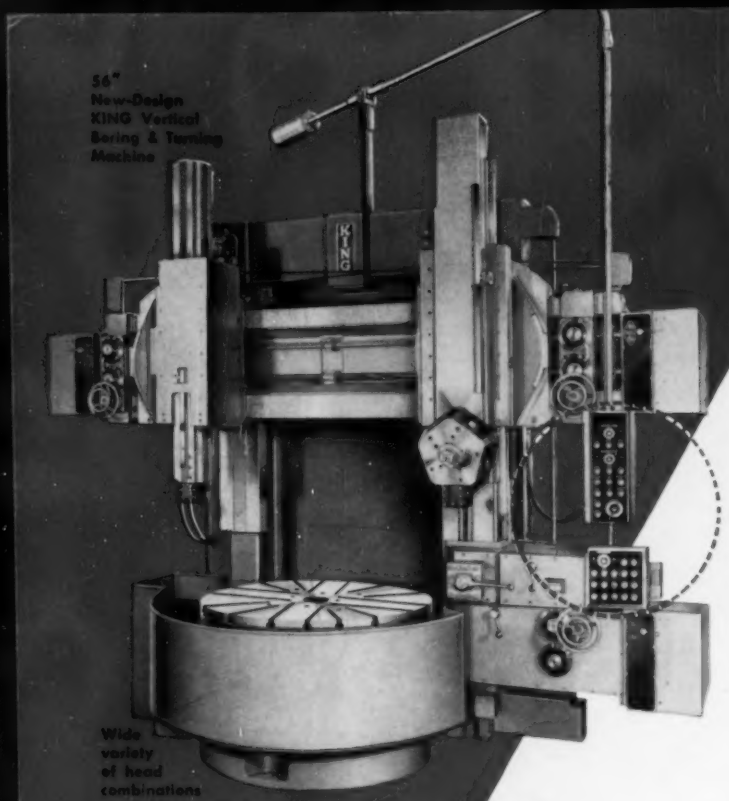

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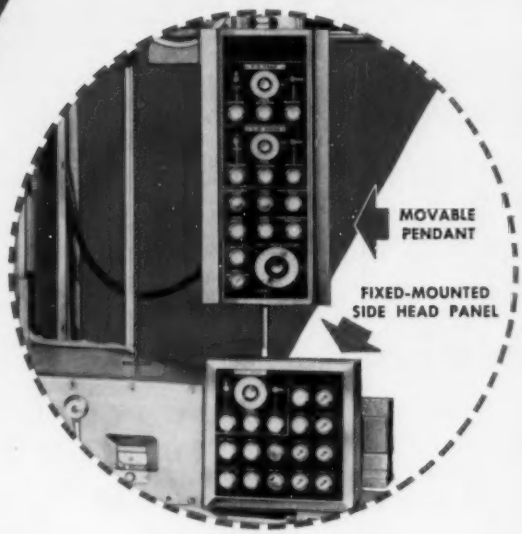

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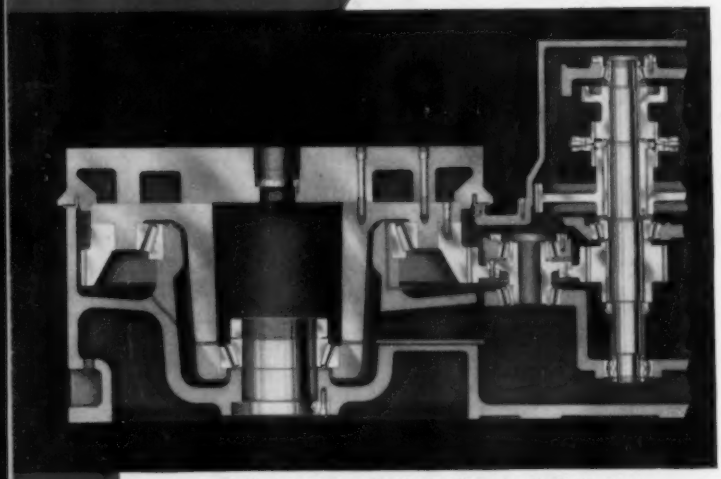

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As shown in drawing, the spindle itself is extra heavy and rigid. Tapered roller, pre-loaded bearings are located so as to provide maximum spread, both radially and vertically, on the spindle. This construction greatly increases stability of the mounting. Note also that the drive is of helical-gear type, eliminating any tendency toward spindle deflection and loss of accuracy—a tendency always present with bevel gearing.

Full electrical operation has been engineered into these streamlined New-Design KING® Vertical Boring & Turning Machines. Control manipulation is cut to a bare minimum, speeding set-up time. Direction of all head movements is established by simplified "up-down" and "in-out" switches. Spindle speeds and feeds for all heads are pre-selective from direct-reading dials, conveniently located on the movable pendant and fixed side head panel, as are all other electrically operated controls.

Increased horsepower plus expanded speeds and feeds will remove metal at rates that take fullest advantage of the most modern cutting tools. Improved spindle operation, with resultant increased accuracy, is assured by many advanced construction features as illustrated in drawing at left. Integral drive construction permits removal of the entire drive as a unit, for easy maintenance.

These and other superior advantages in the new KING machines will greatly increase both accuracy and productivity on your boring, facing, and turning work. For full details see your King Distributor, or write us direct.

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KING Vertical Boring and Turning Machines